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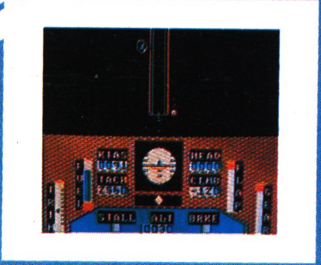
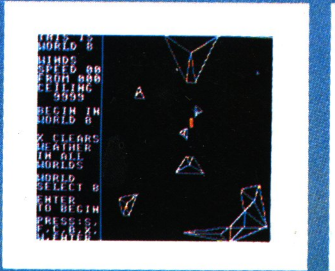




```
THIS IS
WORLD 8

WINDS
SPEED 00
FROM 000
CEILING
  9999

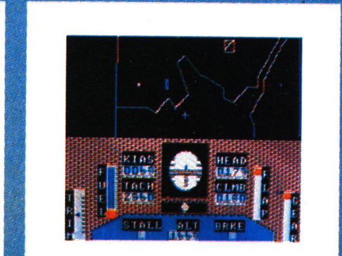
BEGIN IN
WORLD 8

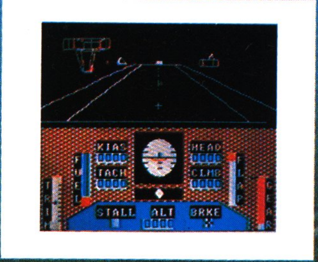
X CLEARS
WEATHER
IN ALL
WORLDS

WORLD
SELECT 8

ENTER
TO BEGIN

PRESS:S,
F,L,B,X,
W,ENTER
```





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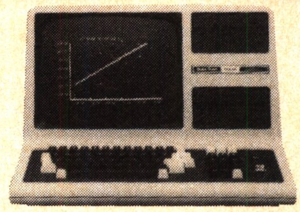

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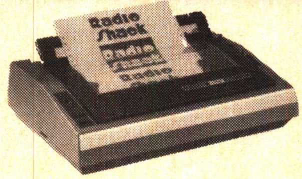

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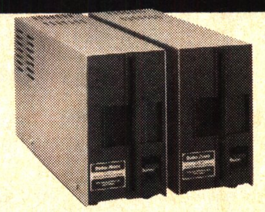

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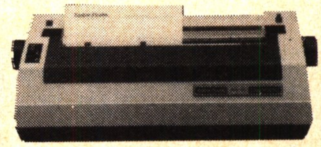

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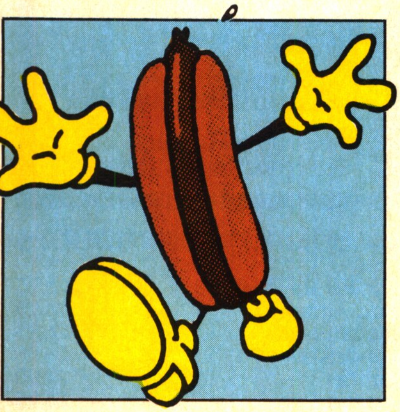

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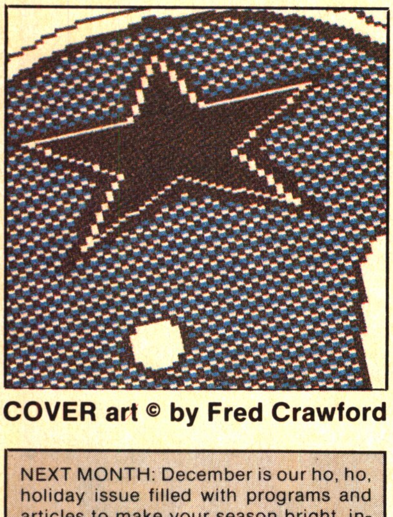

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COVER art © by Fred Crawford

NEXT MONTH: December is our ho, ho, holiday issue filled with programs and articles to make your season bright, including Christmas carols, Christmas graphics, Christmas and Hanuka cards, and much more.

We'll also announce the winners of our Second Annual RAINBOW Adventure Contest and include one or two of the finest entries.

As always, there will be a mix of articles, departments and product reviews just for CoCo — more information than is available anywhere! Happy Holidays!

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The RAINBOW

November 1984 Vol. IV No. 4

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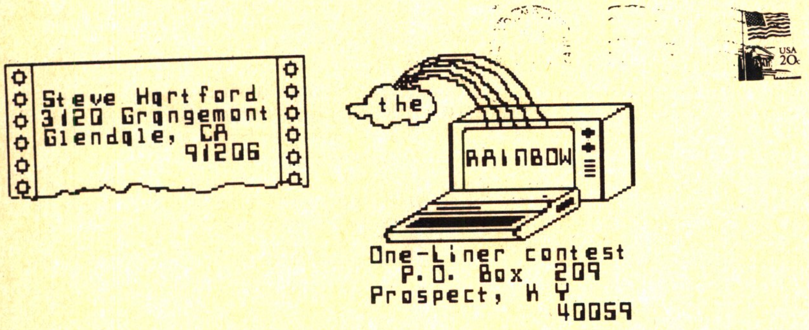
LETTERS TO THE RAINBOW

ARTS AND LETTERS



Steve Hartford
Glendale, CA

Envelope Of The Month

Editor's Note: Please see the "one-liners" sprinkled throughout this issue of THE RAINBOW. Submit your favorite one-liner too.

INFORMATION PLEASE

Editor:

I have a TRS-80 Color Computer 2 16K ECB and have been trying to find the *POKE* command to make my computer not list a program.

I would appreciate it if you could send me this command. I believe I saw it printed somewhere in one of your mailers but I have misplaced it.

J. Chris Carter
Troy, NC

Editor's Note: If you would like to keep your program from listing, use *POKE383,158*. To return to normal listing, type *POKE383,0*.

Editor:

I have been involved with an organization for single parents, Parents Without Partners.

I thought it might be interesting to have a computer date-matching program that I could bring to meetings or parties. It would be desirable for several people to answer a series of questions and then be able to see how closely matched some may be.

So, if possible, I would like to see a date matching program in a future issue of THE RAINBOW. I'm sure it would be of interest to many.

Peter Tillema
Franksville, WI

Editor's Note: You may be interested in "What Is Your Compatibility Rating?" which appeared on Page 292 in the February 1983 issue of THE RAINBOW.

Editor:

I would like to know of any agricultural software for my CoCo 2. I have looked in Radio Shack's Agricultural Software Book without luck.

My address is: 417 N. Jackson, 39470.

Dominic Tynes
Poplarville, MS

Editor:

Could you tell me where I can write to and obtain a program that will allow me to transfer my machine language programs from tape to disk, even if I don't know the beginning and ending address.

William Borowicz
Troy, MI

Editor's Note: Try *Limousine Utility* by Roger Schrag on Page 48 in the January 1984 RAINBOW.

CARTOON MAKER

Editor:

Who makes and sells computers and graphics printers for animating cartoons?

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Dieter Klose
Rio de Janeiro, Brazil

Editor's Note: There is a new product by Triad Pictures Corp. called *The Animator* that might help you. Check this month's "Received & Certified" for details.

Editor:

I have recently purchased Radio Shack's Hi-Res screen print utilities Cat. No. 26-3121, for the 16K CoCo.

I have had trouble loading this into in 64K CoCo with extended BASIC. In the book supplied with the screen print, it says to type *CLEAR 200,12288* and ENTER, then *CLOADM "PROGRAM", (50688+NEW ADDRESS)* to reset the default address. This has not worked and shows an FC Error. Can you tell me how I may load this program into my machine?

Richard Higley
Whittier, CA

Editor's Note: Try *CLEAR 200, 31232:CLOADM "BWDUMP", 16 384.*

MORE CHARACTER

Editor:

I have a 6809 chip with 32K RAM. This uses one-fourth of the normal screen display or 32-character wide. How can I make it 64-characters wide and 32 lines down?

H.A. McAlhany
Anderson, IN

Editor's Note: The 6847 video generator in the CoCo is designed for the 32-column display only. Some driver programs are available to give wider displays.

Editor:

I will be a student at North Marion High School and will be enrolled in two algebra classes, Algebra 1 and Algebra 2. I have looked over THE RAINBOW many times to find programs that will help me in these classes. I would like to know if there are any programs that will help me. I have a 64K Extended Color BASIC Color Computer with cassette and printer. Please send suggestions to: Rt. 3, Box 55, 26582.

Dennis McKinney
Mannington, WV

Editor:

Does anyone have issues July 1982 through January 1983 (Vol. 2, Nos. 1 through 7)?

Please send the issue number and price desired to: 29 Cook Avenue, 14701.

Keep up the good work on a great magazine.

Leon C. Wilson
Jamestown, NY

Editor:

I need a veterinary office management system for the CoCo. Ideally, it would store /index drug information, bill patients and record office visits, but any applicable program is appreciated. Please write: #1 Peterson Court, 62626.

Deanne I. Vermillon
Carlinville, IL

HINTS & TIPS

Editor:

The following statement will transfer your disk directory to any printer.

```
POKE 111,254:DIR
```

Note: You *must* use the colon!

Paul MacArthur
Gillette, WI

Editor:

I have come across a poke statement which I think if you publish may be very helpful to anybody who has a database with a security code.

The following statement disables a 16K CoCo's keyboard:

```
POKE 169,0
```

Kenny Lee
Niagara Falls, NY

Editor:

I would like to pass on a tip that I think is very helpful for people calling bulletin boards. Have your tape recorder connected to the phone line when you call. You can have a record of the conversation.

Then after you are through calling, you can play the tape back into the modem. You can pick out the things you might have missed, or could not get into your buffer.

Thomas Bailey
Fredericktown, MO

COLORS GALORE

Editor:

I have heard much about overlaying *PMODE 3* and *4* to obtain more colors. In *PMODE 4*, however, I have found a way to use four colors very easily:

```
POKE 178,0    BLACK
POKE 178,1    BLUE
POKE 178,2    ORANGE
POKE 178,3    WHITE
```

(This is with *SCREEN 1,1* — other colors appear with *SCREEN 1,0.)*

Pokes to 178 with a higher value than three create multicolored patterns (using all eight colors) that are very useful before a *PAINT* or *LINE*, etc.

Mark Charney
Denville, NJ

Editor:

Here's a twist on *The Simplicity of Sine-lines* which appeared in your Oct. 1983 issue, Page 80. Using the *178 POKE*, this really adds the "Jackson Pollock" effect. Make these changes:

```
Add Line 30 POKE 178,RND(255)
Change Line 150 GOTO 30
```

Paul Feldman
Wayne, NJ

Editor:

I would like to bring to the attention of Disk Extended BASIC users that it is possible to use a *FOR/NEXT* loop to *FIELD* a direct access file buffer.

For example, to create 16 fields of four bytes each, one can use the standard syntax which results in a lot of typing or do the same task by using the following line:

```
NNN FOR I=1 TO 16:FIELD#1,I-*4 AS
D$,4 AS V(I):NEXT
```

The D$ variable is a dummy whose purpose is only to move the pointer in the buffer to the correct position. Unequal field lengths can easily be managed if the size of each field is put in an array. I hope that this informa-

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tion may be useful to some of your readers.

I would like to know what to do to hook an IDS Prism Printer to my Computer (that printer has both serial and parallel capabilities).

THE RAINBOW is the source of information for CC owners and I keep reading it with great interest.

Daniel Paradis
Fleurimont, Quebec

COCO GETS CHECKERED FLAG

Editor:

CoCo wins the Pocono 500! The winner of the Pocono 500, Danny Sullivan, and his pit crew used a CoCo I (silver) to help manage his fuel and passed Rick Mears and Bobby Rahal with only a few laps to go to win the race. Even old CoCos are great!

Jon Alchin
Lompoc, CA

BOUQUETS

Editor:

I just have to let you know about one of your advertisers. A few weeks back I ordered a CoCo Cooler from REM Industries. Well, it came and I installed it per the enclosed instructions and the cooler ran very hot. Concerned about this, I called REM and was advised this running hot was not a normal condition for the cooler. The gentleman that answered the phone advised me to send the unit back and it would be replaced, as it was guaranteed.

I am pleased to say I am using the new CoCo Cooler now and it is working beautifully. Also, I received a note from Richard at REM asking me to accept the keyboard cover enclosed with the cooler for my inconvenience with the first unit. That's very nice and beyond ordinary customer service, and REM Industries will remain tops on my list of suppliers of equipment for my CoCo.

R.C. Hughes
Waxahachie, TX

Editor:

A rare event compels me to take keyboard in hand to sing the praises of one of your advertisers and columnists. I am referring to Daniel Adams Eastham, president of DEFT Systems, Inc. and writer of your new "Personable PASCAL" column.

As a satisfied owner of DEFT PASCAL Workbench and enthusiastic reader of "Personable PASCAL," I had occasion to write a letter recently to Mr. Eastham in which I inquired about a situation that occurs when running one of the workbench programs. Four days after mailing the letter I received a return response which contained not only the answers to my questions, but also a diskette with the latest versions of the workbench programs — FREE OF CHARGE! I believe this kind of service and concern for customer satisfaction from a software vendor is rare indeed, and worthy of praise and recognition.

On top of this is the fact that the DEFT PASCAL Workbench programs are absolutely first rate software which I heartily recommend to anyone who wishes to work with the PASCAL language on the CoCo without the need for OS-9, FLEX, or any other such operating system. My congratulations and thanks to both Mr. Eastham and THE RAINBOW for maintaining such high standards.

Wes Johnson
Leominster, MA

MAKIN' MUSIC

Editor:

Ever since I typed in *Music+* from the June 1984 issue of THE RAINBOW [Page 74], I have typed in song after song from church hymnals, piano sheet music and borrowed music books. I was impressed by the difference between *SOUND* and *PLAY* but I was overwhelmed by the CoCo's four-part harmony capability.

I would like to ask THE RAINBOW readers who have computerized any of their favorite songs, if they would like to trade binary music programs by tape or disk. I have several disks of music programs like *Star Wars, Nadia's Theme, Dr. Zhivago,* or *The William Tell Overture*. This offer is also open to the readers who use *Composer* (THE RAIN-

THE BOOK THAT CAN LAUNCH A 1000 PROGRAMS

500 POKES PEEKS 'N EXECS
FOR THE TRS-80 COLOR COMPUTER

500
POKES
PEEKS 'N EXECS
FOR THE
TRS-80 COLOR COMPUTER
Kishore M. Santwani

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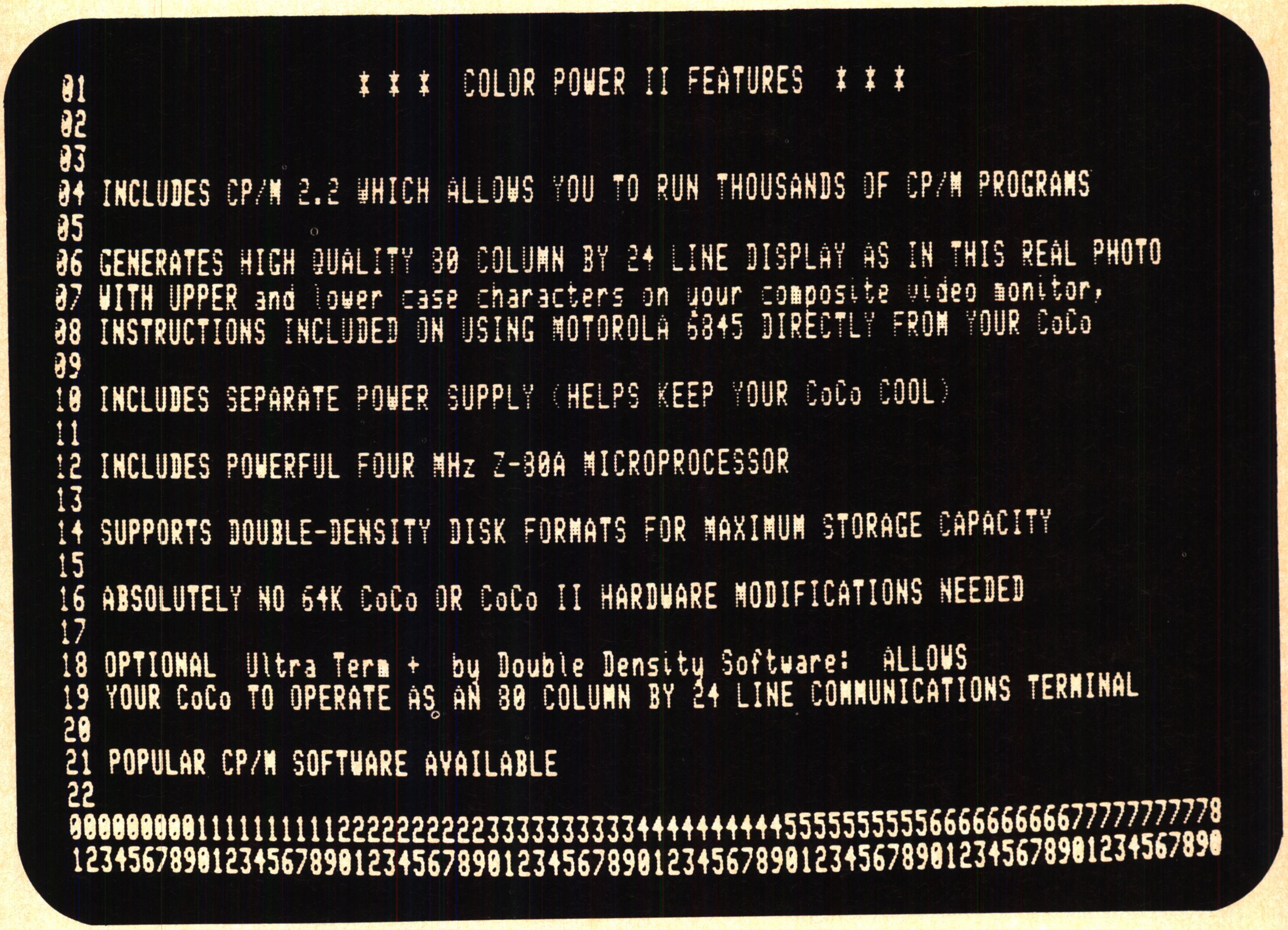

```
01                *** COLOR POWER II FEATURES ***
02
03
04 INCLUDES CP/M 2.2 WHICH ALLOWS YOU TO RUN THOUSANDS OF CP/M PROGRAMS
05
06 GENERATES HIGH QUALITY 80 COLUMN BY 24 LINE DISPLAY AS IN THIS REAL PHOTO
07 WITH UPPER and lower case characters on your composite video monitor,
08 INSTRUCTIONS INCLUDED ON USING MOTOROLA 6845 DIRECTLY FROM YOUR CoCo
09
10 INCLUDES SEPARATE POWER SUPPLY (HELPS KEEP YOUR CoCo COOL)
11
12 INCLUDES POWERFUL FOUR MHz Z-80A MICROPROCESSOR
13
14 SUPPORTS DOUBLE-DENSITY DISK FORMATS FOR MAXIMUM STORAGE CAPACITY
15
16 ABSOLUTELY NO 64K CoCo OR CoCo II HARDWARE MODIFICATIONS NEEDED
17
18 OPTIONAL  Ultra Term +  by Double Density Software:  ALLOWS
19 YOUR CoCo TO OPERATE AS AN 80 COLUMN BY 24 LINE COMMUNICATIONS TERMINAL
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21 POPULAR CP/M SOFTWARE AVAILABLE
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BOW, December 1983, Page 131), *Musica* (Speech Systems) or any other music programs. I hope to not only gain new music programs, but also new friends.

Write me at: 539 S. Berthe Avenue, 32404.

Mikel Rice
Panama City, FL

KUDOS

Editor:

A colleague just passed me the July RAINBOW and drew my attention to the article about the *Arconiax Assignment* [Page 90]. I read this article with a lot of interest. It is quite an original idea to develop a computer game with a scent sheet.

Myra Prinsen
Tilburg, Holland

Editor:

You are obviously very proud of your magazine and rightfully so. With that in mind here is a bit of trivia for you.

I recently purchased from the Jesse Jones Box Corp. a set of magazine binders to file my RAINBOW copies, and I recommend these to everyone. When I got them all put into the binders I was profoundly impressed with the weight. I subscribed in October of 1982 so the three copies of that year did not get bound but they weighed 2.5 lbs., 1983 weighed 9.0 lbs., and up to July of 1984 they weighed 8.5 lbs. That represents a lot of paper, a lot of printing and one heck of a lot of editing and planning. I did not go so far as to calculate the number of characters per copy but it might be interesting and would be staggering.

The magazine has been a "God-send" to me, as I am a self-taught computer nut. Keep up the good work. You have a right to be proud.

Ken Burdon
Barrington, RI

CLUBS, CLUBS, CLUBS

Editor:

The Colorado Color Computer Club meets the first Wednesday of the month at 7 p.m. at the Westminster Public Library, 3031 W. 76th Avenue. For more information, call (303) 650-9768 or 427-1925, or write P.O. Box 33492, 80233.

Lee R. Castens
Westminster, CO

Editor:

This is to announce the existence of the CoConuts, a Color Computer Users Group. We started our group in February and are having good success after nine months of activity and organization. We have 17 members and new inquiries weekly. Most of the interest is in wanting to know more about this new activity — computing. Our address is: CoConuts, 1610 N. Marlan, 65803. Or call (417) 485-3419.

Steve Knittel
Springfield, MO

Editor:

We would like to let all the Columbia, S.C. area Color Computer users know that there is a tutorial group in Columbia dedicated exclusively to the Radio Shack, TDP 100, and work-alike Color Computers. This group meets twice a month and each meeting is a classroom type tutorial from bare BASIC to the latest software on the market. Tutorials are given by the members who are using Color Computers in their workplace and hobbyists who simply enjoy learning and sharing more about their machines' potential. I invite anyone who wishes to learn more or share their knowledge to call me at (803) 786-0541 or write to 3562 Linbrook Drive, 29204 for more information on the "Invitational Software Group."

Tom Reed
Columbia, SC

STRAIGHTENING THE PIPELINE

Editor:

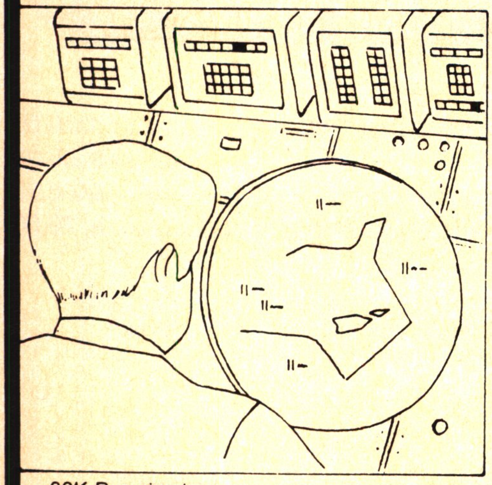
I am writing in response to the "premature" announcement in September's Pipeline column on Page 136 of THE RAINBOW. To set the record straight, Spectrum Projects is the only distributor of Jeff Francis' *Disk Utility 2.1* program that was reviewed in the October 1984 [Page 220] RAINBOW.

Bob Rosen, President
Spectrum Projects

It's Here!

REALISTIC, FULL-FEATURED . . .

AIR TRAFFIC CONTROL SIMULATOR



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Now available for all models, including CoCo 2.

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TRS-80
COLOR COMPUTER

Compare it with the rest. Then, buy the best.

If you've been thinking about spending good money on a new keyboard for your Color Computer, why not get a good keyboard for your money?

Designed from scratch, the HJL-57 Professional Keyboard is built to unlock ALL the potential performance of your Color Computer. Now, you can do real word processing and sail through lengthy listings...with maximum speed; minimum errors.

At $79.95, the HJL-57 is reasonably priced, but you can find other CoCo keyboards for a few dollars less. So, before you buy, we suggest that you compare.

Compare Design.
The ergonomically-superior HJL-57 has sculptured, low profile keycaps; and the three-color layout is identical to the original CoCo keyboard.

Compare Construction.
The HJL-57 has a rigidized aluminum baseplate for solid, no-flex mounting. Switch contacts are rated for 100 million cycles minimum, and covered by a spill-proof membrane.

Compare Performance.
Offering more than full-travel, bounce-proof keyswitches, the HJL-57 has RFI/EMI shielding that eliminates irritating noise on displays; and four user-definable function keys (one latchable), specially-positioned to avoid inadvertent actuation.

Free Function Key Program
Your HJL-57 kit includes usage instructions and decimal codes produced by the function keys, plus a free sample program that defines the function keys as follows: F1 = Screen dump to printer. F2 = Repeat key (latching). F3 = Lower case upper case flip (if you have lower case capability). F4 = Control key; subtracts 64 from the ASCII value of any key pressed. Runs on disc or tape; extended or standard Basic.

Compare Installation.
Carefully engineered for easy installation, the HJL-57 requires no soldering, drilling or gluing. Simply plug it in and drop it right on the original CoCo mounting posts. Kit includes a new bezel for a totally finished conversion.

Compare Warranties.
The HJL-57 is built so well, it carries a full, one-year warranty. And, it is sold with an exclusive 15-day money-back guarantee.

Compare Value.
You know that a bargain is a bargain only so long as it lasts. If you shop carefully, we think you will agree...The HJL-57 is the last keyboard your CoCo will ever need. And that's **real** value.

Order Today.
Only $79.95, the HJL-57 is available for immediate shipment for either the original Color Computer (sold prior to October, 1982) or the F-version and TDP-100 (introduced in October, 1982), and the new 64K CoCo. **Now also available for CoCo 2.**

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Dealer inquiries invited.

PRINT #-2,

One of the absolutely best things about being able to have some association with THE RAINBOW is the opportunity to meet and share information with so many of you in various parts of the country. As just about everyone reading this column knows, we have three RAINBOWfests — our own shows — each year, and these give me a chance to meet thousands of CoCoists each time.

But we attend other shows, too, and those also give me a chance to see a lot of people. And, by the time you read this, we will have participated in a number of the Radio Shack computer showcases as well. Since we also publish PCM — *The Magazine for Professional Computing Management*, which covers the Model 100 and the Tandy 2000, this will be a special series of shows because we will be able to see many people whom we feel we support, but who do not attend RAINBOWfest (and rightly so) because they own something other than our CoCo.

One of the best things about talking with people at shows, whether they be RAINBOWfests or something else, is to see how very deeply interested many are in the Color Computer. And, from those shows, not a little bit of interest is generated in the advertising part of the business.

I was having just such a discussion a couple weeks ago at the National Software Show in Los Angeles and, interestingly, a couple of days later at the Byte Computer Show in San Francisco. Both of the people I was talking with suggested that we were "selling" a good product with RAINBOW advertising because, from everything they had heard, the market was receptive to new and good products.

I told both of them that, to my mind, we were not so much in the business of selling advertising as we were in selling success. One of them made the comment — which I felt was a very nice and kind one — that we were, in fact, selling the hopes and dreams embodied in a rainbow.

Rainbows, after all, mean more than the pot of gold that is supposed to be at their end. And, even though I sort of stumbled on the name, rainbows have to mean people's ideas for hopes and dreams. Dorothy, you will remember, wanted to travel "Over The Rainbow."

I started thinking back across the three-plus years we have been around. Remembering some of the people who started with us, and those who came along later, it is really nice to recall what they were doing when they started and what they are doing now.

Several days later, and virtually marooned in St. Louis by a flight to Louisville that was due in at 9:30 p.m., but ended up (sans luggage) arriving at 3:30 a.m., I had some time to leaf through THE RAINBOW and recall what some of our advertisers were doing when they started with us.

An electrician, a copier repairman, a radio announcer, a housewife, a teacher, and a bunch of other people were doing things they "sort of" liked, but didn't think were so very special. Now, they have businesses — some large, some smaller — and are very involved with something they really like: working with their CoCo. The interesting thing about all of this is the two people I had specifically talked with were both working in other jobs, but wanting to "be in business" for themselves with CoCo.

The point of all this is that you can do that, too. If you have a program or two, or just an interest in writing a program or two, you *can* get involved in all of this. And, with some attention to good business practices and the like, good marketing and caring for your customers, you may be in the position of having your own business, too.

In many ways I consider the Color Computer an idea machine — but it creates an ideal market, too. Consider the IBM, the Commodore, and some of the others. The costs of being involved in such a market are high. Compare our advertising rates — for ads which reach a vast majority of the CoCo Community — with those for *PC World* or *Compute's Gazette* or *Byte*. We're talking the difference between hundreds and thousands of dollars.

The purpose of all this is to say that if you have a yen to get into the CoCo market, and you think you have some good ideas, give it a try. A bunch of people have, and a bunch of people are glad they did.

Telewriter-64™

the Color Computer Word Processor

- **3 display formats: 51/64/85 columns × 24 lines**
- **True lower case characters**
- **User-friendly full-screen editor**
- **Right justification**
- **Easy hyphenation**
- **Drives any printer**
- **Embedded format and control codes**
- **Runs in 16K, 32K, or 64K**
- **Menu-driven disk and cassette I/O**
- **No hardware modifications required**

THE ORIGINAL

Simply stated, Telewriter is the most powerful word processor you can buy for the TRS-80 Color Computer. The original Telewriter has received rave reviews in every major Color Computer and TRS-80 magazine, as well as enthusiastic praise from thousands of satisfied owners. And rightly so.

The standard Color Computer display of 32 characters by 16 lines without lower case is simply inadequate for serious word processing. The checkerboard letters and tiny lines give you no feel for how your writing looks or reads. Telewriter gives the Color Computer a 51 column by 24 line screen display with *true lower case characters*. So a Telewriter screen looks like a printed page, with a good chunk of text on screen at one time. In fact, more on screen text than you'd get with Apple II, Atari, TI, Vic or TRS-80 Model III.

On top of that, the sophisticated Telewriter full-screen editor is so simple to use, it makes writing fun. With single-letter mnemonic commands, and menu-driven I/O and formatting, Telewriter surpasses all others for user friendliness and pure power.

Telewriter's chain printing feature means that the size of your text is never limited by the amount of memory you have, and Telewriter's advanced cassette handler gives you a powerful word processor without the major additional cost of a disk.

> *...one of the best programs for the Color Computer I have seen...*
> — Color Computer News, Jan. 1982

TELEWRITER-64

But now we've added more power to Telewriter. Not just bells and whistles, but major features that give you total control over your writing. We call this new supercharged version Telewriter-64. For two reasons.

64K COMPATIBLE

Telewriter-64 runs fully in any Color Computer — 16K, 32K, or 64K, with or without Extended Basic, with disk or cassette or both. It automatically configures itself to take optimum advantage of all available memory. That means that when you upgrade your memory, the Telewriter-64 text buffer grows accordingly. In a 64K cassette based system, for example, you get about 40K of memory to store text. So you don't need disk or FLEX to put all your 64K to work immediately.

64 COLUMNS (AND 85!)

Besides the original 51 column screen, Telewriter-64 now gives you 2 additional high-density displays: 64 × 24 and 85 × 24!! Both high density modes provide all the standard Telewriter editing capabilities, and you can switch instantly to any of the 3 formats with a single control key command.

The 51 × 24 display is clear and crisp on the screen. The two high density modes are more crowded and less easily readable, but they are perfect for showing you the exact layout of your printed page, *all on the screen at one time*. Compare this with cumbersome "windows" that show you only fragments at a time and don't even allow editing.

RIGHT JUSTIFICATION & HYPHENATION

One outstanding advantage of the full-width screen display is that you can now set the screen width to match the width of your printed page, so that "what you see is what you get." This makes exact alignment of columns possible and it makes hyphenation simple.

Since short lines are the reason for the large spaces often found in standard right justified text, and since hyphenation is the most effective way to eliminate short lines, Telewriter-64 can now promise you some of the best looking right justification you can get on the Color Computer.

FEATURES & SPECIFICATIONS:

Printing and formatting: Drives any printer (LPVII/VIII, DMP-100/200, Epson, Okidata, Centronics, NEC, C. Itoh, Smith-Corona, Terminet, etc).

Embedded control codes give full dynamic access to intelligent printer features like: underlining, subscript, superscript, variable font and type size, dot-graphics, etc.

Dynamic (embedded) format controls for: top, bottom, and left margins; line length, lines per page, line spacing, new page, change page numbering, conditional new page, enable/disable justification.

Menu-driven control of these parameters, as well as: pause at page bottom, page numbering, baud rate (so you can run your printer at top speed), and Epson font. "Typewriter" feature sends typed lines directly to your printer, and Direct mode sends control codes right from the keyboard. Special Epson driver simplifies use with MX-80.

Supports single and multi-line headers and automatic centering. Print or save all or any section of the text buffer. Chain print any number of files from cassette or disk.

File and I/O Features: ASCII format files — create and edit BASIC, Assembly, Pascal, and C programs, Smart Terminal files (for uploading or downloading), even text files from other word processors. Compatible with spelling checkers (like Spell 'n Fix).

Cassette verify command for sure saves. Cassette auto-retry means you type a load command only once no matter where you are in the tape.

Read in, save, partial save, and append files with disk and/or cassette. For disk: print directory with free space to screen or printer, kill and rename files, set default drive. Easily customized to the number of drives in the system.

Editing features: Fast, full-screen editor with wordwrap, block copy, block move, block delete, line delete, global search and replace (or delete), wild card search, fast auto-repeat cursor, fast scrolling, cursor up, down, right, left, begin line, end line, top of text, bottom of text; page forward, page backward, align text, tabs, choice of buff or green background, complete error protection, line counter, word counter, space left, current file name, default drive in effect, set line length on screen.

Insert or delete text anywhere on the screen without changing "modes." This fast "free-form" editor provides maximum ease of use. Everything you do appears immediately on the screen in front of you. Commands require only a single key or a single key plus CLEAR.

> *...truly a state of the art word processor... outstanding in every respect.*
> — The RAINBOW, Jan. 1982

PROFESSIONAL WORD PROCESSING

You can no longer afford to be without the power and efficiency word processing brings to everything you write. The TRS-80 Color Computer is the lowest priced micro with the capability for serious word processing. And only Telewriter-64 fully unleashes that capability.

Telewriter-64 costs $49.95 on cassette, $59.95 on disk, and comes complete with over 70 pages of well-written documentation. (The step-by-step tutorial will have your writing with Telewriter-64 in a matter of minutes.)

To order, send check or money order to:

Cognitec
704 Nob Street
Del Mar, CA 92014

Or check your local software store. If you have questions, or would like to order by Visa or Mastercard, call us at (619) 755-1258 (weekdays, 8AM-4PM PST). Dealer inquiries invited.

(Add $2 for shipping. Californians add 6% state tax. Allow 2 weeks for personal checks. Send self-addressed stamped envelope for Telewriter reviews from CCN, RAINBOW, 80-Micro, 80-U.S. Telewriter owners: send SASE or call for information on upgrading to Telewriter-64. Telewriter-compatible spelling checker (Spell 'n Fix) and Smart Terminal program (Colorcom/E) also available. Call or write for more information.)

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VIDEO PLUS	22.45
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J&M DISK CONTROLLER	139.00
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SPECTRUM LIGHT PEN	17.95
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GRAPHICOM	26.95 (D)
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DISTRIBUTED BY SOFTMART

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BEARGRIP SOFTWARE

AN EXTRAORDINARY TEST OF YOUR MEMORY SKILLS. YOU MUST MATCH HIDDEN PAIRS OF PICTURES. THE DIFFICULTY LEVEL MAY BE ADJUSTED FRO A PLAY FIELD OF 6 SQUARES (PRESCHOOL LEVEL) UP TO 132 SQUARES. A GOOD CHALLENGE FOR ALL AGES.

INTRODUCTORY PRICE .... 13.95(C)/15.95 (D) 32K EXT.

"WORKBASE"
FROM THE CREATORS OF HOMEBASE

AN INTEGRATED PACKAGE FOR BUSINESS THAT PERFORMS DATABASE, SPREADSHEET, WORD PROCESSING, AND MAIL MERGE FUNCTIONS ALL IN ONE.

INTRODUCTORY PRICE:

WORKBASE I	61.95	400 RECORDS
WORKBASE II	75.00	1200 RECORDS

"MATHS-TREK"

A CHALLENGING PROGRAM THAT CAN BE SET FOR ADDITION, SUBTRACTION, MULTIPLICATION, DIVISION, FRACTIONS AND SQUARE ROOT PROBLEMS. YOU COMMAND THE 'ENTERPRISE' AND YOUR MISSION IS TO RETURN BACK SAFELY TO 'STARBASE.' SUDDENLY YOU SPOT KLINGONS COMING WITHIN RANGE. TO INCREASE WARP YOU MUST ANSWER THE PROBLEM CORRECTLY. IF NOT . . . FOR AGES 6-12.

INTRODUCTORY PRICE .... 15.95 (C)

"YATCHTSEE"
BEARGRIP SOFTWARE

A GREAT COMPUTER VERSION OF THE POPULAR DICE GAME.

INTRODUCTORY PRICE .... 16.95 (C)/17.95 (D) 32K EXT.

WE ARE ACTIVELY LOOKING FOR GOOD PROGRAMS TO DISTRIBUTE.
WRITE FOR AUTHORSHIP/DISTRIBUTORSHIP PACKAGE.

SEND FOR YOUR FREE DESCRIPTIVE CATALOG (INCLUDE $2.00 FOR SHIPPING AND HANDLING). PLEASE SPECIFY COMPUTER.

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Hey, after all, THE RAINBOW started as a two-page newsletter done, literally, on the kitchen table. I'm sure glad I got into it. And you may be, too.

The holiday season is coming and it might be just the time to start leaving hints for members of your family. Your pre-holiday shopping will probably include some things for your favorite computer. If a renewal subscription to THE RAINBOW is among them, do please remember to include your account number and get that order in before the first of the year.

Yes, there will be a small subscription price increase — but you will be able to renew at the old price (now $28 in the U.S., with an appropriate postage surcharge for other countries). There will be more about this next month.

But, for now, we do have some attractive gift certificates available and those can be mailed to you for use in a stocking, under a tree or beneath a menorah. Hundreds took advantage of our gift program last year, and you can do the same again this year — and realize a savings to boot.

I suppose I should mention something new that we are doing here. We have formed another company called FPSS, Ag. Publishing Enterprises, Inc. Its purpose, essentially, is to publish magazines for other people.

We already plan to publish one beginning in the winter called *Fashion Licensing Review/Revue*, in cooperation with another party. Essentially, the magazine is his idea — we are providing the support for it.

The main difference between this and other publishing companies, however, is that FPSS, Ag. essentially goes into a sort of partnership with someone. This keeps costs really low. If you consider all the things necessary to start a magazine, it seems obvious that it is advantageous to use some things which are already in place. FPSS, Ag. is not a charitable undertaking, though. We expect to turn a profit. But, we will be able to do so through sharing the profits on the publication — not, as so many similar enterprises do, by marking up all of our services.

In short, if you have an idea, write to me. We might be able to get together.

— Lonnie Falk

One-Liner Contest Winner . . .

If you like helicopters, you'll enjoy this one-liner! Just type the program, *RUN* and watch that 'copter go!

The listing:

```
0 DIMA(99):PMODE1:PCLS2:LINE(0,9
9)-(255,0),PRESET,BF:DRAW"BG145C
3R18L9F4L4G2R6C1R2C3D2L14H2L4RU2
D4U2R2F2R8DR4F4L14E4C4":SCREEN1:
FORT=1TO9999999:GET(3,176)-(255,
191),A,G:PLAY"T59D":PUT(0,176)-(
252,191),A,PSET:LINE(252,191)-(2
52,190-RND(14)),PSET:NEXT
```

David Fitzsimmons
Lucas, OH

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book Of Adventure* and its companion *Rainbow Adventure Tape*.)

OS-9 SOFTWARE WITH X-TRA POWER

XTERM

XTERM is a full featured OS-9 communications program that takes full advantage of the power of OS-9. It works with the normal text screen, XSCREEN, or the Wordpak 80 column board.

XTERM is menu oriented for ease of use, it is simple to use even for the novice OS-9 user. And yet, XTERM is powerful enough for the expert OS-9 user.

Some of the features of XTERM include: full upload and download support with remote buffer operation; supports XON/XOFF protocol; 110/300/600/1200 baud, 5/6/7/8 bits, even/odd/no parity, full or half duplex; able to execute an OS-9 shell command from within XTERM.

XTERM works with a Color Computer using the standard serial interface, but also will work with a hardware serial port. Also, if you are using a hardware parallel printer port, you can print data to the printer as it is received.

XTERM $59.95

XSCREEN

XSCREEN creates a high resolution screen for the Color Computer using OS-9. This high resolution screen gives you 24 lines of text with 51, 64, or 85 characters per line. Characters can be either white on a black background or vice versa.

XSCREEN is very easy to use because it is menu operated. No codes to memorize or manuals to consult when you want to change character size, just go to the menu.

XSCREEN $19.95

XWORD

XWORD is a powerful word processing system for the Color Computer using OS-9. XWORD is feature packed with only a few features mentioned here.

Some of the editing features of XWORD include: true character oriented full screen editor; works with the normal text screen, XSCREEN, O-PAK, or WORDPAK 80 column card; full block commands with blocks displayed in inverse characters (except with normal text screen) for easy block manipulation; file size not limited to a buffer size; full find and replace commands with wildcard character; able to execute an OS-9 shell command in the middle of editing. Many, many more features, too many to mention here.

Some of the formatting features of XWORD include: proportional spacing supported; perfectly aligned hanging indents and columns, even when using proportional characters; full printer control with control of character size, emphasized, italics, overstrike, underlining (with or without spaces), super and sub-scripts; up to 10 header/footers; page numbering in decimal or Roman numerals; margins and headers can be set differently for even and odd pages; automatically reads printer initialization file to define XWORD for your printer (many included, and easy to write or modify your own). Many more features.

XWORD $79.95

XED

XED is the editor portion of XWORD. XED includes all of the editing features listed under XWORD above. XED is for people who need a full featured screen editor but do not need all of the formatting power of a word processor.

XED $49.95

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BUILDING NOVEMBER'S RAINBOW

Our Telecomputing Issue . . .
Reading the Electronic Mail . . .
And, Rainbow On Tape, Right Now . . .

Telecommunications? Data Communications? Telecomputing? Strictly speaking, I suppose the terms are not interchangeable, but they're close enough that we'll treat them collectively in this issue of THE RAINBOW. We'll use "telecomputing" as the umbrella term since it seems to best fit our goal of opening up fascinating avenues for exploration through hooking up our Color Computers to other computers. Most often, this is done by telephone or a short cable, but, as our cover illustrates, yes, you can send and receive computer data via ham radio — or even broadcast facilities, for that matter!

If you have the right equipment — and a growing number of our readers do —you can point a home video camera at someone, or something, digitize the picture, and transmit it by ham radio to someone else who then decodes the signal he receives and reproduces the picture on his monitor or even prints out a copy. Not quite network television, but nonetheless a fun thing to do. If you haven't discovered the fun of telecomputing, you're missing a lot.

I won't recite the litany of opportunities that open up once you've added a modem and a terminal program to your CoCo setup, but, as a telecomputing junkie, I can tell you modem mania offers the same sort of consuming, magical allure that kept you up nights on end when you first got your Color Computer.

Myself, I'm a bit of a SIG addict; I get the itch at all hours of the night. In fact, the later the better since the several CompuServe Special Interest Groups I "visit" are less crowded in the wee hours of the morning. Full services like CompuServe, and private bulletin boards, too, are important to me, both for new information and for feedback on THE RAINBOW. When mistakes appear in THE RAINBOW or her sister publications, I usually hear about it first on CompuServe, even though a telephone call would get me a lot quicker.

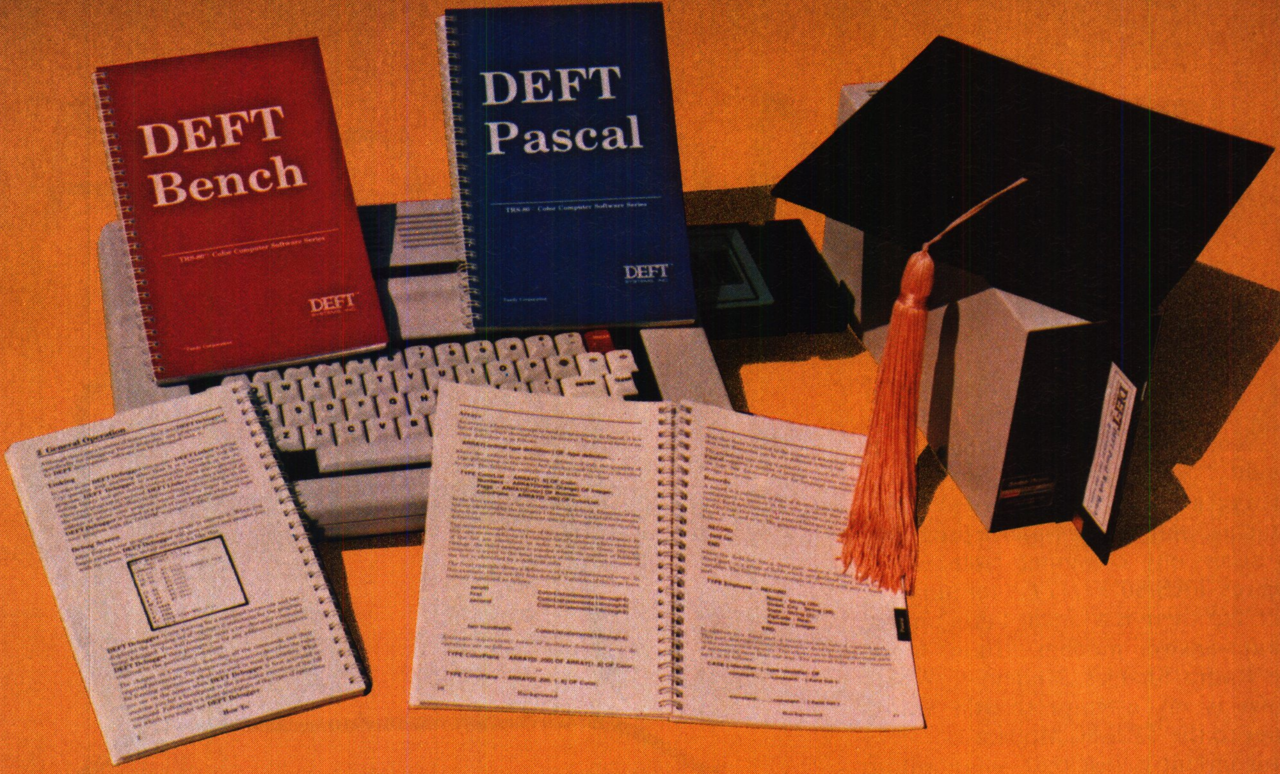
While there are umpteen other things you can do when connected to a host computer like CompuServe, I like to simply "read the mail," not the private "EMAIL," but the open messages that appear on the various bulletin boards. In fact, I enjoy reading everybody else's mail because I learn a lot without having to compose a response or otherwise actively react. "Reading the mail" is a ham radio carry-over that makes more sense with computer bulletin boards than it does with amateur radio. It means to tune in and receive transmissions without transmitting yourself, a convenient way to learn the latest.

In addition to convenience, immediacy is a key attraction of telecomputing. For instance, you can get immediate delivery of RAINBOW ON TAPE through the CompuServe "Softex" service. At $3.50 per individual program, you pay more than you will by purchasing the entire month's tape through the mail for $8, but you get it right away — in minutes! Let's say you see an article in THE RAINBOW that excites you and you want that program; just call CompuServe and within minutes you'll have a copy of the program up and running. It costs, but it's for those who absolutely, positively want it right now — not tomorrow. As more and more people get "online," we'll see all sorts of similar services, at increasingly lower prices.

Want to get into telecomputing? Begin by scanning this issue of THE RAINBOW. We have a terminal program for you in this issue! We also show you how to add auto-answer to a Modem I and bring you an update on our own *Rainboard* bulletin board system that'll set you up to run your own BBS. You'll be "reading the mail" before you know it. And, for "reading in the mail," my usual reminder that a subscription to the Rainbow is the way to "download" more each month about the Color Computer than is available from any other source.

— Jim Reed

Graduate With DEFT Pascal



As a result of the programming language requirement of the Advanced Placement (AP) Tests, Pascal has become the standard language used in High Schools and Colleges today. On the Color Computer, DEFT Pascal is the standard.

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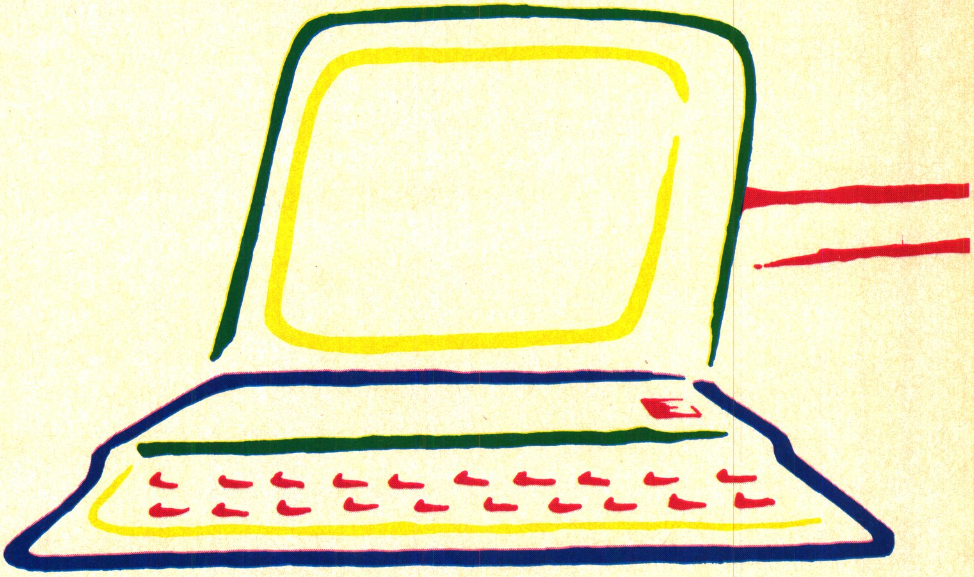
Adding An



After reading Dr. Lane Lester's article in the November '83 issue of RAINBOW ("Rainboard"), I thought, "A bulletin board for CoCo; what a great idea!" My own BBS! Why, I could use only the *Remoterm* program and access my computer from work using my TRS-80 *VIDTEX* terminal.

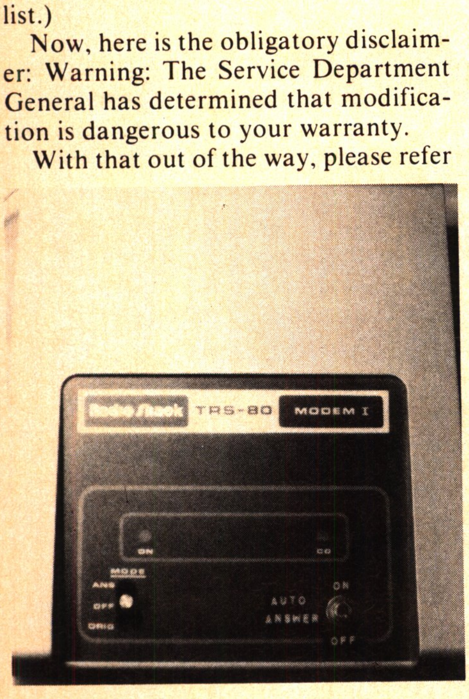
Ah, but there is a catch; I don't have an auto-answer modem. Hmm, I do have Radio Shack's Modem I. What follows is my attempt to add auto-answer to the TRS-80 Modem I.

This circuit is just that — an auto-answer. As long as it receives the caller's carrier tone it will stay on line. When the caller switches her modem off or hangs up the phone, the circuit disconnects. You cannot hang up from program control.

The complete unit fits inside your Modem I under the main board and draws power from the existing power supply. All of the parts can be obtained from your local Radio Shack. (See parts list.)

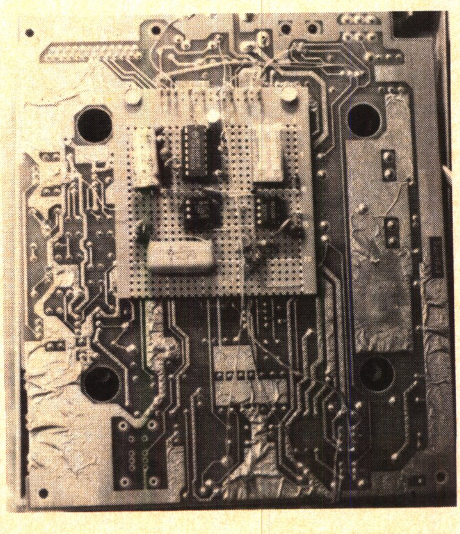
Now, here is the obligatory disclaimer: Warning: The Service Department General has determined that modification is dangerous to your warranty.

With that out of the way, please refer to the schematic for this discussion. IC1A, IC1B and IC2 detect the ring signal from the phone line and use it to trigger the timer, IC3. R4, C3 and D3 create a delay so that the phone is not answered too quickly. The timer, IC3, is set by R6 and C5 to give the caller about 10 seconds to switch her modem on. The output of IC3 is applied to the OR gate formed by D5, D6, R10, R11 and Q1. This pulls in the relay K1 and answers the phone. The carrier detect signal from the modem is applied to point 'B' and is delayed (about two seconds) and conditioned by IC1C and IC1D. It is then applied to the OR gate at Q1. As long as the carrier detect signal is present, the relay will stay pulled in no matter what the timer does. When the caller hangs up and the carrier detect goes away, the relay drops out and the phone is released, ready for another caller.



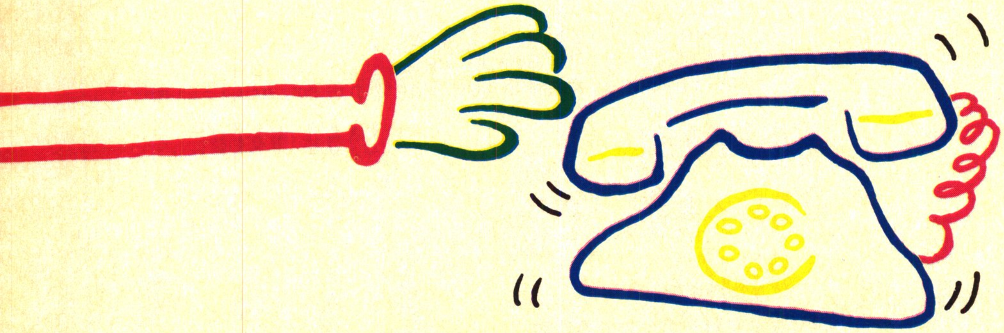
If the circuit answers the phone too quickly or slowly for your tastes, you can change the time constant by changing the values of R4 or C3 or both. If you want more rings, increase the values. If you want fewer rings, decrease the values.

Switch S1 turns the power on to the modem and connects the carrier detect line. Mount it on the top panel of the modem under the CD light, where there is a hole. You may have to cut the lugs

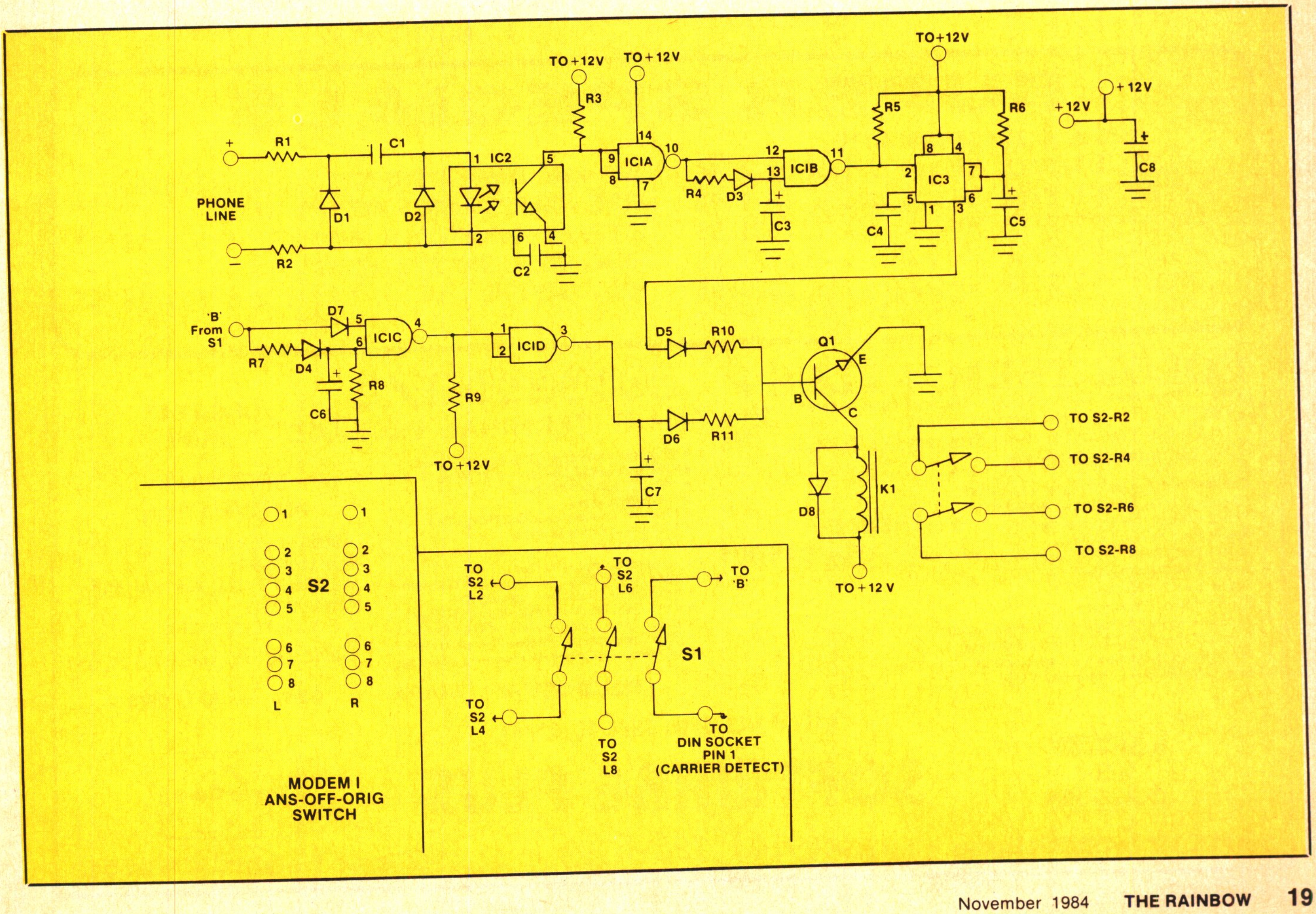


(Tony Sharp, a watchmaker and jeweler, has been involved in computing for only three years but has an extensive background in electronic communication. He holds both commercial and amateur radio operator's licenses.)

Auto Answer



By Tony Sharp



TO +12V
TO +12V
TO+12V
+12V
+12V
PHONE LINE
R1
R2
C1
D1
D2
IC2
C2
R3
ICIA
R4
D3
C3
ICIB
R5
R6
IC3
C4
C5
C8
'B' From S1
R7
D4
D7
C6
R8
ICIC
R9
ICID
TO +12V
D5
R10
D6
R11
C7
Q1
B
E
C
D8
K1
TO +12 V
TO S2-R2
TO S2-R4
TO S2-R6
TO S2-R8
S2
L
R
TO S2 L2
TO S2 L4
TO S2 L6
TO S2 L8
TO 'B'
S1
TO DIN SOCKET PIN 1 (CARRIER DETECT)
MODEM I ANS-OFF-ORIG SWITCH

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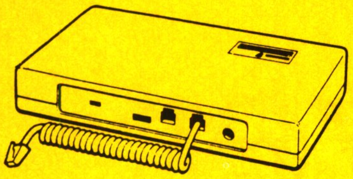

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Data Interface	RS-232C compatible, built-in cable to computer	
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Transmit Level	-12 dBm typical	
Receive Frequency	ORIG	ANSW
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shorter to keep it from hitting the board.

Switch S2 is the existing ANS-OFF-ORIG in the modem. It must be in the "OFF" position when using auto-answer. The view of the switch terminals in the schematic is from the bottom (underside) of the modem circuit board.

The Modem I connects the phone line via a cable that plugs into your modular jack. It is at the modem board end of this cable that you make the connections I call Phone Line '+' and '–'. In my installation the red wire is positive and the green wire is negative. You should check this out with a VOM before making those connections.

The auto-answer board is powered from the modem board; so we need to locate the point I call '+12'. When you first open the case, look at the lower center of the board and you will see U1. This is the 12-volt regulator. It is a square-looking device with three pins and is secured with a screw. With the board oriented with U1's pins to your left, the pin you want is the one nearest you. Locate this point on the bottom of the board and you have +12. Remember to connect the auto-answer board's ground to the modem board's ground.

I picked up the carrier detect signal from pin-1 of the DIN socket at the rear of the board.

The prototype was built on a small perf board and wired point to point. Parts placement is not critical. If you use IC sockets (you'll be glad you did), be sure to use the low profile type and do not use one for the relay K1; there is not enough room.

It is a good idea to bring all the external connections out to the end of the board to terminals. (I used short, stiff pieces of wire.) This makes it easier to wire it to the modem.

The auto-answer board is mounted on the underside of the modem board. Luckily there are two fairly large ground pads in just the right spot to mount the board. Solder a number six nut on each of the pads to match the spacing of the holes in the board and use two short screws to attach it. Be certain that there is enough spacing between the auto-answer board and the modem board but not too much. It's pretty tight in there.

> ***"The complete unit fits inside your Modem I under the main board and draws power from the existing power supply."***

Please be sure to check and recheck all connections. We don't want to blow up the modem! When you have everything wired up, boxed up and ready, plug the modem into the phone jack and to the computer. (It will not work if you have the printer plugged in instead!) Load in your communications program, set the mode switch to "OFF" and set the auto-answer switch (S1) to "ON." At this time the "ON" LED should be lit. Have a friend call you, but tell her to just listen and not turn her modem on. After your modem answers the phone she should hear your carrier tone for about 10 seconds after which your phone should hang up. This tests the time out timer. Now have her call you again and go on-line just like she would if calling a BBS. When she switches her modem on, your CD light should come on. You can now proceed to communicate with your new auto-answer modem! If you have any problems, turn the modem off and check all connections and wiring.

An entirely new area of data communication is now possible for you without any great expense. So, go ahead and set up your own bulletin board or remotely accessed computer. The possibilities are endless.

I will be glad to answer any questions I can if you send a SASE to Tony Sharp, 118 W. Solomon St., Griffin, GA 30223.

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Formerly Saturn Electronics Company Inc.

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Make listing lines easier with . . .

EZ List

By Michael Davidson

EZ List, a machine language utility program, was written to eliminate the need to use the SHIFT @ keys to control program listing. This program will allow you to use the up and down arrow keys to list one line at a time.

Type in the BASIC listing and save a copy to tape before running it. It will be erased after it has put the machine code into memory.

First the BASIC program will find the top of memory (Line 140). It will then clear enough space for the machine code (Line 150) and find the new top of memory on Line 160.

Lines 170 to 200 read the *DATA* statements and place them in the protected memory. Line 210 starts the machine code. Line 220 finds the start of BASIC to be used by Line 230. Line 230 places two zeros at the start of BASIC to effectively erase the BASIC program. Line 240 places zeros in a memory location that is used by the interpreter to remember what line it is working on.

The start section changes two memory locations to enable the computer to jump to the *EZ List* code when a key is pressed.

The second section, *PRINT*, is the first place the computer jumps to when a key is pressed. The print routine checks to see if the up arrow key has been pressed. If it has, its value will be changed from 94 to one. This will prevent the computer from printing the up arrow.

The third section, *INPUT*, is the main part of the program. It checks to see if either of the arrow keys have been pressed. If so, this routine finds the next higher and lower line numbers and their addresses. It then calls the *LIST* subroutine.

The *LIST* routine calls the ROM routines that decode the program line and print it on the screen.

One final note: If you are going to be loading several programs with *EZ List* running, use the *LIST* command as soon as the new program is loaded from tape or disk. The computer remembers where the last line was, even when a new program is loaded. Depending on what the line addresses are, *EZ List* may find the next line. If it doesn't, the computer will hang up. If this should happen, don't worry, just press the Reset switch and type *LIST* and press ENTER. This will restore control without destroying your program.

(Michael Davidson, a service technician for Diebold Inc., works on alarms, automated teller machines and remote banking equipment.)

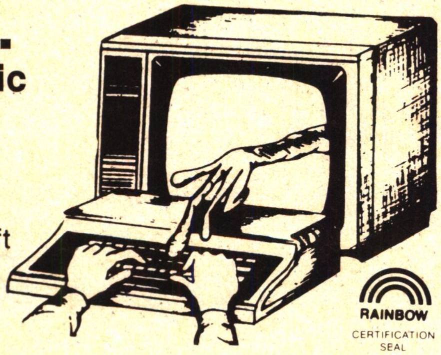
110 57
260 98
END 180

The listing:

```
10 'EZLIST
20 'BY MICHAEL DAVIDSON
30 'FARGO ND
40 '11/83
50 'THIS BASIC PROGRAM IS USED
   TO LOAD THE MACHINE CODE
   INTO UPPER MEMORY
60 'AFTER THE MACHINE CODE IS IN
   PLACE THE BASIC PROGRAM WILL
   BE ERASED
70 'USE THE UP AND DOWN ARROW
   KEYS TO LIST ONE LINE AT A
   TIME
80 'THE LIST COMMAND WILL STILL
   WORK AS IT DID BEFORE.BUT
   NOW THE SHIFT @ COMBINATION
   WILL NOT BE NEEDED
90 'WHEN LOADING PROGRAMS FROM
   TAPE OR DISK USE THE LIST
   COMMAND BEFORE USING THE UP
   AND DOWN ARROW KEYS
```

"The Best Typing Teacher For The Color Computer"

E.T.T.
Electronic Typing Teacher
by
CHERRYSoft



Learning to type the right way can save you hours of tedious work when entering programs into your CoCo, and this is just what ETT was designed to do. Devote a little time every day practicing with ETT and before you know it you will be typing with confidence. Entering those programs will no longer be the chore it used to be.

ETT's video keyboard lets you practice with all the keys labeled, all the keys blank or only the "home" keys labeled. The visual cues guide you while you learn to type without watching your fingers. ETT shows your accuracy, response time, and words per minute. You will quickly see that you are improving with practice.

With the sentences provided by ETT learning to type can be fun. Over 1000 variations chosen because they include every letter in the alphabet. You can also create your own practice sets. This outstanding program was written by a certified teacher and professional programmer and comes with a ten page student manual-study guide. Requires 16K Extended Basic.

Cassette $21.95 plus $2.50 shipping

"It's fairly obvious to someone with a couple of decades of typing experience that a professional instructor was instrumental in setting up this sophisticated program. It is a serious program for the person who wants to learn to type. It is not a game by any means, but it does make learning fun.

. . .an incredible value."

RAINBOW REVIEW
JULY 1984

"We bought the program ET, from you and it is an excellent tape for drilling and learning."

ST. ISIDORE SCHOOL
NEWTON, WISCONSIN

"Just received Electronic Typing Teacher it is the best typing tutor for Color Computer — Thanks."

TOMLINSON JR. HIGH SCHOOL
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ETT is now being used by schools and colleges throughout the U.S.
See E.T.T. at your favorite dealer or order direct.

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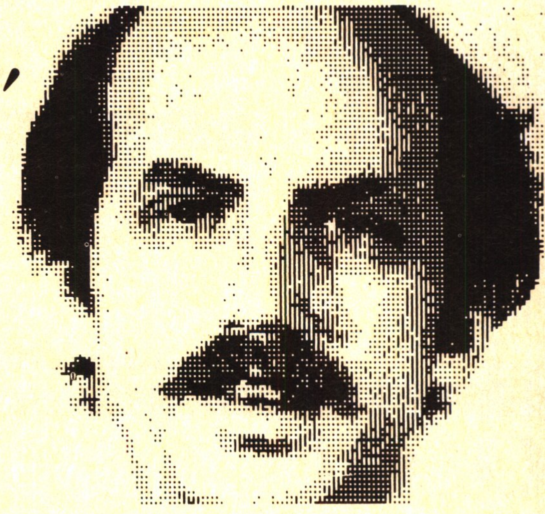
Phone (313) 722-7957

```
100 'THIS WILL PREVENT THE
    PROGRAM FROM LOCKING UP
110 'THIS HAPPENS WHEN THE LAST
    LINE LISTED IS HIGHER THAN
    THE HIGHEST LINE OF THE NEW
    PROGRAM
120 'IF YOU FORGET AND IT LOCKS
    UP, JUST HIT THE RESET AND
    TYPE LIST AND <ENTER>
130 CLS
140 TM=PEEK(39)*256+PEEK(40)
150 CLEAR 200,TM-240
160 TM=PEEK(39)*256+PEEK(40)
170 FOR X=TM TO TM+223
180 READ A
190 POKE X,A
200 NEXT X
210 EXEC TM
220 P=PEEK(25)*256+PEEK(26)
230 POKE P,0:POKE P+1,0
240 POKE &H2B,0:POKE &H2C,0
250 DATA 49,141,0,220,190,1,107,
175,164,48,141,0,36,191,1,107,49
,141,0
260 DATA 214,190,1,104,175,164,4
8,141,0,4,191,1,104,57,129,94,38
,8,111
270 DATA 130,90,134,1,50,98,57,1
10,157,0,185,52,119,51,141,0,169
,129
280 DATA 1,39,20,129,10,38,10,14
1,26,236,70,221,43,174,72,141,12
2,53,119
290 DATA 110,157,0,145,141,10,23
6,66,221,43,174,68,141,106,32,23
8,158
300 DATA 25,236,132,38,4,50,98,3
2,228,220,43,39,60,16,131,255,25
5,39,54
310 DATA 237,66,175,68,16,174,13
2,16,174,164,38,5,237,70,175,72,
57,16
320 DATA 163,2,39,14,52,6,236,2,
237,66,53,6,175,68,174,132,32,23
7,16
330 DATA 174,132,16,174,164,39,2
,174,132,236,2,237,70,175,72,32,
218,236
340 DATA 2,237,70,175,72,237,66,
175,68,16,174,132,16,174,164,39,
200,175
350 DATA 68,236,2,237,66,174,132
,38,238,32,188,52,16,189,189,204
,189
360 DATA 185,172,53,16,189,183,1
94,206,2,221,166,192,39,5,189,18
5,177,32,247,189,185,92,57
```

TALKHEAD

FOR THE
'REAL TALKER'

"Way beyond anything you have ever seen for the CoCo"



That's a strong statement, we know. But wait until you see 'TALKHEAD'! It's a dazzling creation—easily the most impressive display of CoCo graphics you can buy!

If you have a 'REAL TALKER' voice synthesizer, DO NOT deprive yourself of this absolutely incredible Talking Head simulation program! TALKHEAD uses the 'Real Talker' and extremely high speed/high resolution machine language to create an audio-visual simulation that clearly goes way, way beyond anything that you have ever seen on ANY home computer!

TALKHEAD's fast, smooth-talking animation is so stunningly life-like that it resembles a movie more than a cartoon! This page shows some still shots of the actual moving image as it will appear on your TV screen.

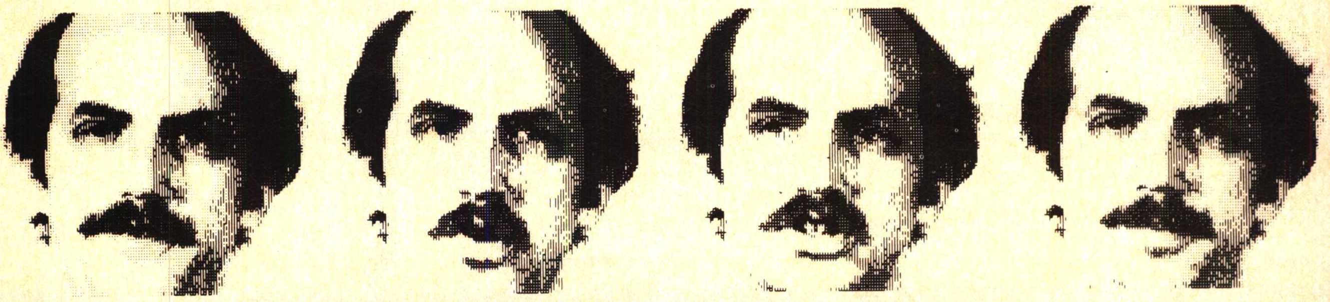
And, TALKHEAD is a real snap to use in Basic, thanks to a new command that we give you: SAY. Type SAY "ANYTHING YOU WANT" and Talkhead instantly appears and speaks ANY text—it has an unlimited vocabulary!

The most impressive CoCo program you can buy . . .

'TALKHEAD' is available on cassette or disk (please specify) for ***only $29.95.*** The cassette version can be transferred to disk in case you ever upgrade. TALKHEAD requires 64K of memory and a Colorware 'REAL TALKER' voice pak.

ONLY $29^{95} FROM COLORWARE

PROGRAM BY TIM JENISON   SPEECH PROGRAMMING BY H. PUNYON



'TALKHEAD's eyes, mouth and jaw move, realistically animating his speech. The effect is amazing!

MORE SOFTWARE FOR THE 'REAL TALKER' VOICE PAK

STELLAR SEARCH ADVENTURE

If you ever had an urge to command the USS Enterprise, this talking version of 'STELLAR SEARCH' from Owl-Ware is for you! It uniquely combines the best aspects of 'adventure' and graphic 'action' type games and puts the 'Real Talker' voice pak to good use. You'll find graphics galore in this exciting package containing more than 86K of action adventure. Requires 32K and a 'Real Talker' voice pak. ***Cassette....$24.95. Disk....$26.95***

TALKING EDUCATIONAL SOFTWARE

SOFTWARE FOR CHILDREN FROM COMPUTER ISLAND

Math Drill	**$ 9.95**
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All 3 for Only	**$24.95**

Requires 16K and a Colorware 'Real Talker' voice pak.

ADVENTURE STARTER

The popular 'ADVENTURE STARTER' from Owl's Nest Software is now available in a speaking version for the 'Real Talker' voice tynthesizer. Adventure Starter is a painless and enjoyable way to learn about computer adventure games. Included are two adventures. The first is "MYHOUSE", an easy game with plenty of help and hints. A second adventure, 'PIRATES', is more challenging. Both are great fun for the adventure minded. This is the only way to get into CoCo adventuring! Requires 16K Extended Basic and a 'REAL TALKER' voice pak. ***Cassette, only $17.95.***

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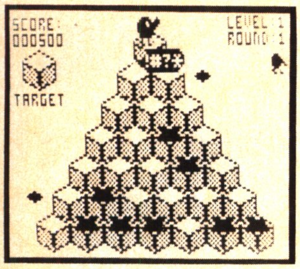
ALL SOFTWARE ON THIS PAGE REQUIRES A COLORWARE 'REAL TALKER' VOICE PAK.

THE TOP 4 COCO GAMES...

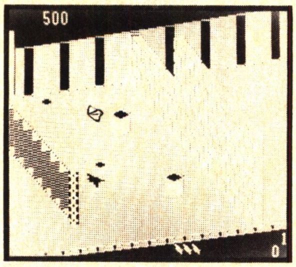


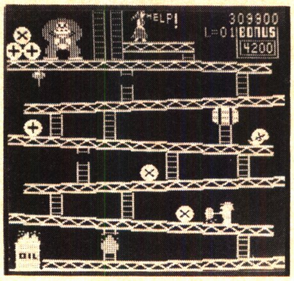
CUBIX

By Spectral Associates. Very much like the arcade smash! Jump little Cubix around the 3D maze trying to change the color of all the squares. With Death Globes, Discs, Snakes, etc. 32K Tape: $24.95

ZAKSUND

From Elite Software comes this fantastic arcade style space action game with 3 different stages of moving 3-D graphics. You've never seen anything like this on your CoCo! Great sound too! 32K Tape: $24.95



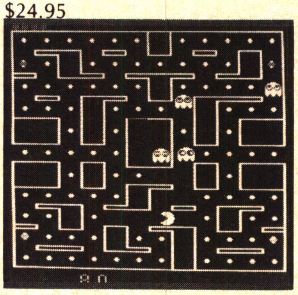


THE KING

Previously called 'Donkey King', you simply cannot buy a more impressive game for your CoCo. With 4 different screens and loads of fun! From Tom Mix Software. 32K Tape: $25.95

GHOST GOBBLER

From Spectral Assoc. This "PAC" theme game has been improved several times. It is definitely the best of its type. Brilliant color, action and sound, just like an arcade. 16K Tape: $24.95



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SUPER JOYSTICK MODULE

WITH RAPID FIRE!

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JOYSTICK INTERFACE/RAPID FIRE/6 FT. EXTENDER ALL IN ONE! The Colorcade allows connection of any Atari type joystick to your CoCo (including the Wico Red Ball). These switch type sticks are extremely rugged and have a faster and more positive response. They will improve the play of almost any action game.

An adjustable speed rapid fire circuit is built in. Press your fire button and get a great burst of fire instead of just a single shot! You get a real advantage in shooting games that do not have repeat fire.

ATARI JOYSTICK

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THE BEST YOU CAN BUY
WICO #15-9730
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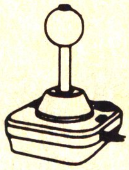

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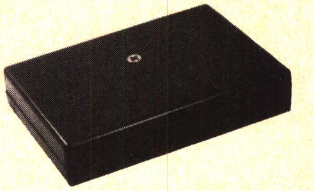

Give a professional look to your project or product! High quality 3 piece injection molded plastic with spring loaded door. Designed especially for the CoCo ROM slot.

2 - 4 pcs.	$5.50 Ea.
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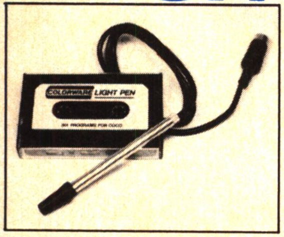
100 & UP	Call Us.

P.C. board for 27XX EPROMS... $4.00 Ea.

COLORWARE LIGHT PEN

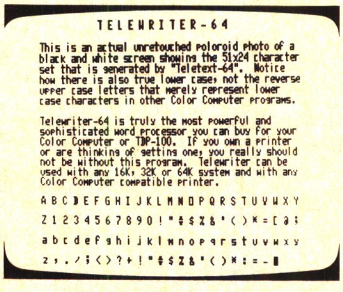


ONLY $19.95

WITH SIX FREE PROGRAMS ON CASSETTE!

The Colorware Light Pen plugs directly into your joystick port and comes with six fun & useful programs on cassette. Easy instructions show how to use it with Basic and it's compatible with light pen software such as Computer Island's "Fun Pack." Order yours today. Only $19.95 complete.

TELEWRITER-64



```
TELEWRITER-64

This is an actual unretouched poloroid photo of a
black and white screen showing the 51x24 character
set that is generated by "Teletext-64".  Notice
how there is also true lower case, not the reverse
upper case letters that merely represent lower
case characters in other Color Computer programs.

Telewriter-64 is truly the most powerful and
sophisticated word processor you can buy for your
Color Computer or TDP-100.  If you own a printer
or are thinking of getting one, you really should
not be without this program.  Telewriter can be
used with any 16K, 32K or 64K system and with any
Color Computer compatible printer.

A B C D E F G H I J K L M N O P Q R S T U V W X Y
Z 1 2 3 4 5 6 7 8 9 0 ! " # $ % & ' ( ) * = [ @ ;
a b c d e f g h i j k l m n o p q r s t u v w x y
z , . / ; < > ? + ! " # $ % & ' ( ) * : = - █
```

DISK $59.95
CASSETTE... $49.95

Colorware researched the word processors available for the Color Computer. This is the best. Telewriter-64 is a truly sophisticated system that is marvelously easy to use. It works with any 16K, 32K or 64K system and any CoCo compatible printer.

TOP-RATED COCO WORD PROCESSOR

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'REAL TALKER'

HARDWARE Voice Synthesizer

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REAL TALKER
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PHONETIC SPEECH DICTIONARY for the SC-01 SPEECH SYNTHESIZER
VOICE SYNTHESIZER
MANUAL

THINKING OF BUYING A COCO VOICE SYNTHESIZER?

READ THIS....

Making your computer talk couldn't be any easier! 'Real Talker' is a full featured, ready to use, HARDWARE voice synthesizer system in a cartridge pak. It uses the Votrax SC-01 phoneme synthesizer chip to produce a clear, crisp voice.

FREE TEXT-TO-SPEECH

Included free with 'Real Talker' is Colorware's remarkable Text-to-Speech program. This is a truly powerful machine language utility. What it does is automatically convert plain English to speech. And it has an unlimited vocabulary! For example, use it in the direct mode: Type in a sentence or a paragraph, even mix in numbers, dollar signs, etc., then press enter. The text is spoken. At the same time a phoneme string is generated which can be saved to cassette or disk, modified or used in a Basic program.

We originally planned to sell this major piece of programming for about $40.00 but decided it was so useful that no 'Real Talker' user should be without it. Besides, it really shows off the capability of 'Real Talker'.

Also included with 'Real Talker' is our unique Phoneme Editor program. It allows you to explore and create artificial speech at the phoneme level. Phenomes are the fundimental sounds or building blocks of word pronunciation. There are 64 different phenomes, as well as 4 inflection levels at your disposal. Creating and modifying speech at the phenome level is both fascinating and educational. The Phenome Editor may also be used to customize the pronunciation of speech produced by the Text-to-Speech program.

You don't have to use any of our utility programs though. If you write your own Basic Programs, you will find the pocket sized Votrax Dictionary (included free) is all you need to make your own Basic programs talk. This dictionary gives you quick access to the phenome sequences used to create approximately 1400 of the most used words in the English language.

How about compatibility? 'Real Talker' is compatible with any 16K, 32K, 64K, Extended or non-extended Color Computer. It works with any cassette or disk based system, with or without the Radio Shack Multi-slot expander. No other synthesizer under $100 can make this claim. Most other CoCo voice synthesizers require an expensive Multi-slot expander in order to work with the disk system. 'Real Talker' requires only an inexpensive Y-adapter. This is an important consideration if you plan on adding a disk or have one already.

'Real Talker' comes completely assembled, tested and ready to use. It is powered by the CoCo and talks through your T.V. speaker so there is nothing else to add. Price includes Text-to-Speech and other programs on cassette (may be transferred to disk), User Manual and Votrax Dictionary. ONLY $59.95

'Y-BRANCHING CABLE' For disk systems. This 40-pin, 3 connector cable allows 'Real Talker' to be used with any disk system $29.95

YOU DECIDE....

Order yours today on our Toll-Free Order Line. If you are not delighted with your 'Real Talker' system, simply return it within 30 days for a prompt, courteous refund.

COLORWARE

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N.Y. RESIDENTS MUST ADD SALES TAX.

COMMUNICATIONS

16K ECB

This intramural bulletin board will save and display messages and maybe even promote family togetherness.

File It With The Message Center

By Jim Schmidt

The Message Center is a program I wrote out of need rather than for fun. Initially, the need was a friend's, not mine. He (a CoCo owner) wanted to be sure that his messages to his teen-age children would be noticed and, hopefully, obeyed. Frequently he could not be home when his offspring arrived from school. He needed a way to leave them chores and also find out from them where they were going to be. Many times notes went unnoticed. Getting them to write him a note was akin to "cruel and unusual punishment" in their eyes.

The Message Center has changed all that for my friend. Because the kids think that using a computer to exchange messages is "tubular," they are a together family once again.

Sometime later, I was recounting the above to yet another friend, and a strange look came over him. He listened patiently, and as the last phoneme passed my lips he

---

(Jim Schmidt is a senior system analyst by profession. He specializes in financial/business systems development. In his spare time, he writes articles and programs for publication using CoCo.)

asked if the program could be used in a small office.

I thought a bit and replied that it could, but I had better add a few bells and/or whistles. It came to me that essentially the program was able to "broadcast" any visual text to those in sight of it. So, why not add *SAVE/LOAD* capability so that, in addition to messages, it could also handle display chores?

The Message Center was born. Friend number two uses the program every day now. His business is real estate which causes him and his two partners to come and go quite often during the day. Whoever answers the phone will typically do this:

1) Call up *The Message Center* program
2) Load the previous messages file
3) Enter the current message
4) Save the new file with the current message

An inquiry about messages is as follows:

1) Call up the program
2) Load the message file
3) Key @@ to begin the display
4) Watch the display using P to pause it where necessary
5) Use M to add more messages/replies if necessary

When he wishes to leave an urgent message, he simply keys in the message and leaves the program running in display mode. The "warble" gets the attention of the next person in the office.

He also takes his CoCo along when he has an open house. In this instance, he loads a previously saved sales pitch and runs it all day in display mode praising the property he is trying to sell.

Another use has been found for the message file by my real estate friend. He wrote a small print program to provide hardcopy of each day's message file. This printout is his follow-up tickler and allows him to inquire from the others if they have phoned so-and-so and what the results were, etc. The file produced by *The Message Center* is a plain vanilla ASCII text file with 32-byte records (strings). So there is no problem dumping it to a printer, if required. The other two partners like getting a hardcopy list of their message traffic periodically, also.

My kids have their own kids, so I can't use the program that way. I have been provided the services of a secretary whose services I share with the other programmers and analysts on the job, so no need there. But, I *do* have a use for the program! The nature of my job is such that I am perpetually studying something — new software, schedules, evaluations, all manner of text. You guessed it! I have found that by keying into *The Message Center* the key phrases and salient points of material I am studying and then just watching the display a few times, I am better able to absorb it.

Features And Functions

To get started, key in the program and *SAVE* or *CSAVE* it. *RUN* it, and the screen prompts you to press ENTER to begin. This prompt is only to let you know that this is an "empty" program and no text resides in memory. Pressing ENTER buys you a beep and a dark screen with the word READY in the lower right corner. You are into the key entry screen which will become apparent when you key the first letter of the first line of text. Key in up to 32 characters. If you key in the full 32 characters, the line will be stored automatically. If your line ends short of 32 characters then press ENTER to store the line. Continue keying and storing lines for the duration of your message. To store a blank line (skip a line), key in a space and press ENTER. Whenever you wish to display the keyed text, key @@ in the first two positions of the line entry area. The display will begin. To return to the entry screen from the display press M. After a short time, the beep will be heard and the dark screen with the READY prompt will reappear. You can now append more messages (hence "M").

> ***"The file produced by* The Message Center *is a plain vanilla ASCII text file with 32-byte records (strings). So there is no problem dumping it to a printer, if required."***

On the entry screen, note the LEFT and LINE prompts. the former will keep track of the remaining characters in a line and the latter denotes the number of the line you are keying. A short beep will sound when you have only five characters remaining in a line. *The Message Center* can store a maximum of 100 lines of 32 characters of text. You can expand this if you like, but I don't recommend it (more on this later).

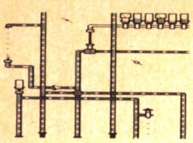
If you make an error keying a line, press the left arrow key and the line will erase allowing you to rekey it correctly. Once a line is stored, it is stored. The logic needed to allow change/delete, it turns out, is rarely required if you keep an eye on the keying. Since *The Message Center* is not a word processor, the overhead of this logic is usually extraneous. I do have a version of the program with change/delete logic installed, but it is slower and not necessary. If your particular application needs this logic, you can add it yourself or send me $5 and I'll send you that version along with a formatted print/dump program for the text file.

You touch typists out there, be careful. A lot is going on between characters in this program and the instruction *INKEY$* is used for key entry. So what, you say? Slow, is what! Not too slow for us two-finger types, but a tad slow for you five-finger folks. As you approach the 100 lines mark, the keying will get sluggish. Plus BASIC is doing its string thing. It is possible then to miss a letter. However, in practice, at an average of two lines per message, you would be approaching 50 messages. It would be better then to save the messages and clear the program to start a second message file. In that case, the first new message should be that there is a previous message file, and to save the current one before loading the older one.

This could be automated also. Logic to prevent a second *LOAD* without an intervening *SAVE* would be easy to implement. This is implemented in the $5 version I mentioned earlier. Usually, it will not be needed. *Please* try to implement these and any other changes you may require yourself. After all, that's what computing is all about.

To clear memory of text, key in five asterisks in the first five positions of the entry line. You are now "empty."

The *SAVE/LOAD* functions are straightforward. While in the entry screen, key two pluses in the first two positions of the line entry area and you will then be prompted further. A *LOAD* will wipe out any text stored so far in the array, so be sure to *SAVE* first if neces-



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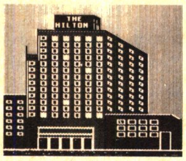

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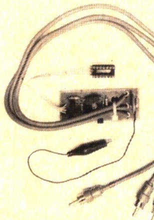

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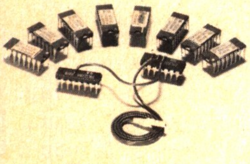

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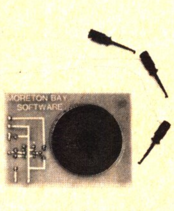
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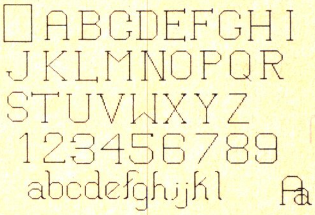
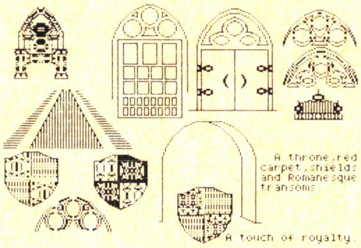
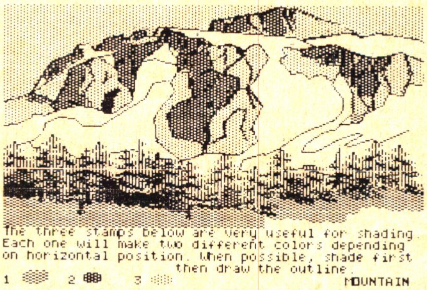

ABCDEFGHI
JKLMNOPQR
STUVWXYZ
123456789
abcdefghijkl
Aa


A throne, red carpet, shields and Romanesque transoms
A touch of royalty

Adventure Disk I (indoor scenes and objects)

Adventure Disk II (outdoor scenes)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1
2
3
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sary. After a *LOAD*, any text keyed in is added to the end of that which came in from the *LOAD*.

All that remains is to mention the PAUSE/RESUME functions. PAUSE will (surprise!) pause the display. If left paused for a couple of minutes, it will resume the display automatically. Keying 'R' while paused will resume the display without a wait.

I would like to hear from anyone who finds unusual or interesting uses to which they have put *The Message Center*. If you write and wish a response, please include a stamped envelope. My address is 196 Arlene Ct., Wheeling, IL 60090.

270	46
480	197
740	21
960	224
1120	47
END	153

The listing:

```
0 '--------------------------
10 '--THE MESSAGE CENTER--
20 '--COPYRIGHT (C) 1983--
30 '--JIM SCHMIDT--
40 '--196A ARLENE CT.--
50 '--WHEELING, IL.  60090--
60 '--------------------------
70 '--EXTENDED COLOR BASIC--
80 '--FOR 16K ==> PCLEAR1--
90 '--------------------------
100 CLEAR 3800,&H3F00
110 DIMB$(100)
120 X=1:CT=0:LO=1
130 GOSUB 550
140 GOSUB780
150 SOUND150,5:GOSUB1240
160 IF X=100THEN380
170 A$=INKEY$:IFA$=""THEN170
180 IFA$<>CHR$(8)THENCT=CT+1
190 IFA$=CHR$(8)THENCT=0:CLS0:L$
="":GOTO150
200 IFCT=27THENSOUND200,1
210 PRINT@54,"LEFT= ";32-CT;
220 PRINT@86,"LINE= ";X;
230 IFA$=CHR$(13)THENA$="":CLS0:
SOUND237,1:CT=32:GOTO280
240 L$=L$+A$:PRINT@0,L$
250 IF LEFT$(L$,2)="@@"THEN380
260 IFLEFT$(L$,2)="++"THEN1010
270 IFLEFT$(L$,5)="*****"THEN131
0
280 IFCT=32THENCT=0:B$(X)=L$:L$=
"":X=X+1:CLS0:SOUND237,1
290 IFX>99THEN GOSUB1280
300 PRINT@128,"   ENTER '@@' TO
START DISPLAY"
310 PRINT@192,"   ENTER '++' TO
SAVE THE TEXT"
320 PRINT@256,"  PRESS P TO PAUS
E THE DISPLAY"
330 PRINT@320," PRESS R TO RESUM
E THE DISPLAY"
340 PRINT@384," PRESS M TO ADD T
O THE DISPLAY"
350 PRINT@448," PRESS LEFT ARROW
 TO ERASE LINE"
360 GOTO160
370 '--DISPLAY ROUTINE--
380 CLS0:L$=""
390 FOR LO=1 TO 5:SOUND239,1:SOU
ND240,1:NEXT
400 FOR LO=1TOX-1
410 M$=INKEY$:IF M$="M"THENCLS0:
CT=0:GOTO150
420 IF M$="P"THENGOSUB 1200
430 P$=B$(LO)
440 F=32-LEN(P$):P$=P$+STRING$(F
," ")
450 GOSUB640
460 NEXT
470 P$=STRING$(32," "):GOSUB640
480 FORDE=1TO2000:NEXT
490 M$=INKEY$:IFM$="P"THENGOSUB1
```

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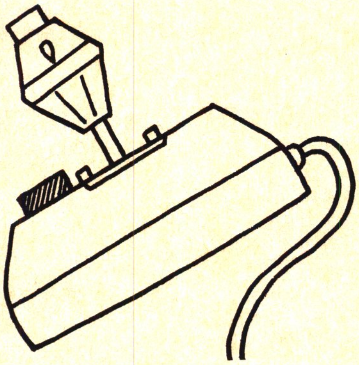
```
200
500 IFM$="M"THENCLS0:CT=0:GOTO15
0
510 CLS0:P=0
520 GOTO390
530 '--M/L ROUTINE TO DEAL WITH
540 '  BASIC'S NASTY SCROLL--
550 CLS0
560 DEFUSR1=&H3F00
570 FOR P=&H3F00 TO &H3F00+52
580 READ ZZ : POKE P,ZZ
590 NEXT P
600 P=0
610 RETURN
620 '--CONVERT TO GREEN ON
630 '  BLACK AND POKE TEXT--
640 IF P$="" THEN RETURN ELSE FO
RZZ=1TOLEN(P$)
650 ZX=ASC(MID$(P$,ZZ,1))
660 IF ZX>63 AND ZX<128 THEN ZX=
ZX-64
670 IF P<0 OR P>511 THEN GOSUB 7
20
680 POKE P+&H400,ZX
690 P=P+1
700 NEXT ZZ
710 RETURN
720 IF P<0 THEN P=0
730 IF P>511 THEN P=480 : V=USR1
(Y)
740 RETURN
750 DATA 142,4,32,16,142,4,0,166
,0,167,32,48,1,49,33,191,63,253,
204,6,0,16,179,63,253,38,236,142
,5,224,134,32,167,0,48,1,191,63,
253,16,142
760 DATA 6,0,16,188,63,253,38,23
9,57,18,0,0,0,0
770 '--T I T L E--
780 P$="   HELLO...":GOSUB640
790 P=32
800 P$=STRING$(32," "):GOSUB640
810 P=64
820 P$="  THIS IS THE MESSAGE CE
NTER":GOSUB640
830 P=96
840 P$=STRING$(32," "):GOSUB640
850 P=128
860 P$="      COPYRIGHT (C) 1983"
:GOSUB640
870 P=160
880 P$="      JIM SCHMIDT":GOSUB6
40
890 P=192
900 P$="      196A ARLENE CT.":GO
SUB640
910 P=224
920 P$="      WHEELING, IL. 60090
```

```
":GOSUB640
930 FORDE=1TO1000:NEXT:CLS0
940 P=288
950 P$="    PRESS <ENTER> TO BEG
IN":GOSUB640
960 A$=INKEY$:IF A$<>CHR$(13)THE
N960
970 P=0:P$=""
980 CLS0
990 '--TAPE/DISK I/O ROUTINE--
1000 RETURN
1010 CLS:PRINT@137,"tAPE OR dISK
??"
1020 SOUND234,1
1030 D$=INKEY$:IFD$<>"T"AND D$<>
"D"THEN1030
1040 IFD$="T" THEN DV=-1 ELSEDV=
1
1050 PRINT@137,"sAVE OR lOAD??"
1060 SOUND234,1
1070 D$=INKEY$:IFD$<>"S" AND D$<
>"L"THEN1070
1080 IFD$="L"THEN FT$="I" ELSE F
T$="O"
1090 PRINT:PRINT"           READY
 DRIVE"
1100 INPUT"FILENAME IS ";FI$
1110 IFFT$="I"THENX=1
1120 OPEN FT$,#DV,FI$
1130 IF FT$="O"THEN FORLP=1TO X-
1
1140 IF FT$="I"THENIF EOF(DV) TH
EN 1180
1150 IF FT$="O"THEN PRINT #DV,B$
(LP)ELSE LINE INPUT #DV,B$(X)
1160 IFFT$="I"THENX=X+1
1170 IFFT$="O"THEN NEXTLP ELSE G
OTO1140
1180 CLOSE#DV:CLS0:CT=0:L$="":GO
TO150
1190 '--PAUSE ROUTINE--
1200 FORDE=1TO10000
1210 N$=INKEY$:IFN$="R"THENRETUR
N
1220 NEXT:RETURN
1230 '--READY PROMPT--
1240 POKE1531,18:POKE1532,5
1250 POKE1533,1:POKE1534,4
1260 POKE1535,25:RETURN
1270 '--100 LINE LIMIT REACHED-
1280 P$="WARNING - MAX LINES IS
100":SOUND 245,10:P=480
1290 GOSUB640:RETURN
1300 '--PURGE ARRAY--
1310 CT=0:L$="":A$="":FORLL=1TOX
-1:B$(LL)="":NEXT:CLS0:X=1:GOTO1
50
```



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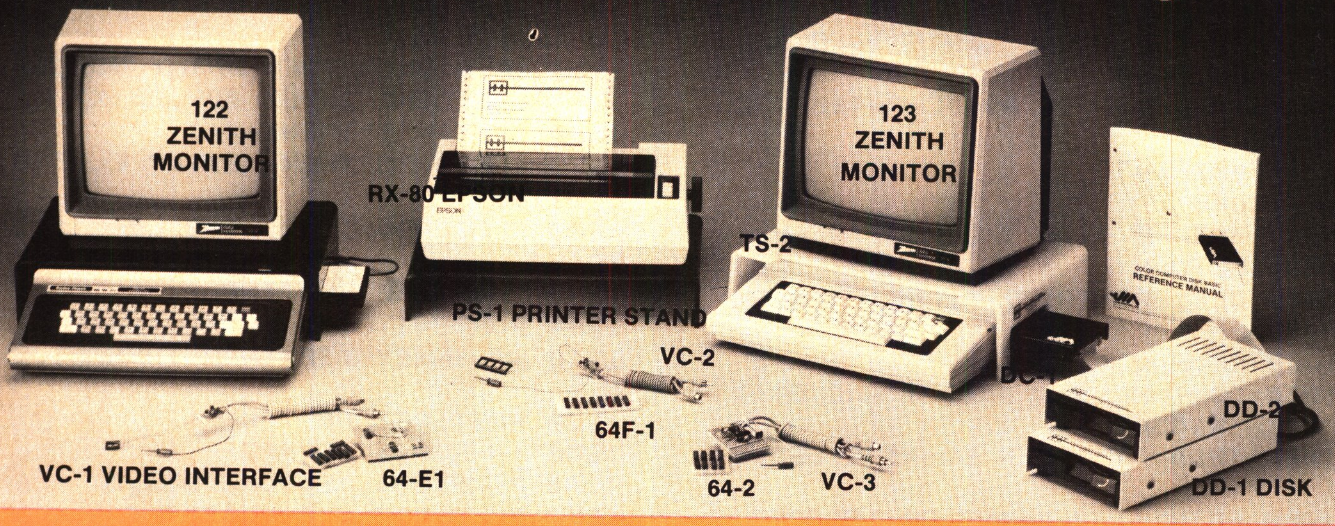

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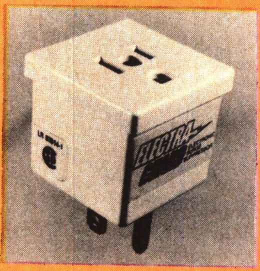

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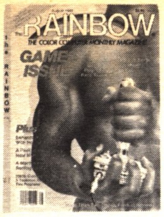

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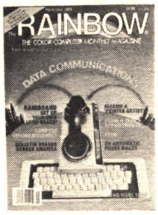

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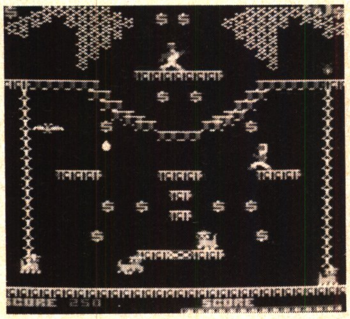
CASH MAN

By Bill Dunlevy & Doug Frayer

Exploding with color, racing with fast animation, and roaring with sound, this great non-violent game is destined to be a classic! The review in February's issue of RAINBOW says this: "A Fun Investment" "it is totally unique" "I found it very tough to tear myself away from playing the game long enough to write about it! In short, CASHMAN is one fun game. Buy it."



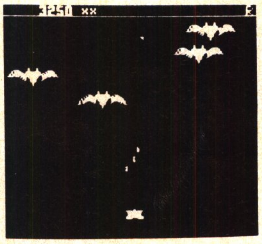
Dozens of levels and screens (more than FORTY!) offer anyone, from beginner to expert, as much good clean fun as they want! Higher levels include special Mystery Pieces and Expert Puzzle Pieces and Expert Puzzle Screens. Play alone or go for the ultimate challenge of two-player simultaneous competition. Run along the colorful girders, jump across the tremendous chasms, climb the ropes and ladders, or grab a BYRD and fly to get the loot before your opponent does, but watch out! The KATS are on the prowl and your opponent is tossing eggs! Run, jump, climb, or fly to your nearest Color Computer and play CASHMAN!

32K - Tape $27.95
Disk $29.95

DEMON SEED

By Jeffery Sorenson
& Phillip MacKenzie

All alone in the silence of space, you switch on the view-port to look at the brilliant stars. And then you see THEM: a massive hoard of bat-like aliens, swarming towards you! The ship trembles under the distant explosions of enemy fire. You have only one chance for survival - Fight! As you attempt to defeat each new wave of enemy ships, they only get stronger and faster! If by some miracle you survive the first assault, you find yourself pitted against enemies so swift, powerful, and outright evil that only one name fits them - DEMONS! And if that's not enough, they bring out the heavy artillery - the Mother Ship! Engaging in battle, you see a dark cloud against the stars: another invasion fleet!



Created in the same spirit of the classic arcades games like Phoenix and Galaga, DEMON SEED is a great package of arcade fun and action. Different screens of bats, demons, and special challenge rounds keep the excitement high and the competition stiff!

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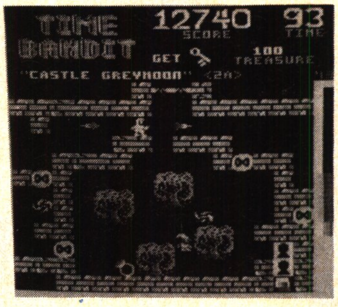
TIME BANDIT

By Bill Dunlevy & Harry Lafnear

Tired of games that only have a few screens or force you to follow strict levels? In TIME BANDIT, you virtually create your own game! You can choose from more than TWENTY places through-out the game, with more than 15 distinct variations and levels of difficulty in each place; this means over 300 variations!



Use the TIMEGATES to travel to the three different Worlds of Time, each containing a multitude of colorful and unique adventuring areas. Visit the medieval dungeons of FANTASY WORLD, recapture the days of yesteryear in WESTERN WORLD, and reach for the stars in FUTURE WORLD. Fight the Evil Guardians: the Looking Lurker, Angry Elmo, Killer Smurphs, and more! Find the Keys and escape with the treasures of time. But hurry - your power is fleeting! Crisp Supergraphics, colorful scrolling landscapes, full animation of a multitude of characters, great sound, and over THREE HUNDRED SCREENS - it's all here! The conquest of time and space awaits!

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MichTron

THE ROAD RACE

By Shane Franklin

Here's a game that all racing fans might enjoy. All it takes is a 16K Extended Color Computer, a joystick and a little time. The rules are as follows:

Limits of Gears

Maximum speed in first gear is 25 MPH.
Maximum speed in second gear is 50 MPH.
Maximum speed in third gear is 75 MPH.

Accelerate — push stick forward (up)
Decelerate — pull back (down)
Gear Up — push stick up and press button
Gear down — push stick down and press button

Note: If HP gets over 8000, you will blow your engine.

(Shane Franklin is a 15-year-old sophomore at Marshall Sr. High School, Marshall, Texas, who became interested in computers about two years ago. After receiving his computer, he has become a "computer addict" and plans a career in this field.)

When you load the program you will see the track and a lot of numbers. The numbers are the maximum speed for that turn. The program is a little slow, but, it takes a while for the computer to show the gear, speed and horse power. If you want the game to go faster you will have to take out the part of Line 670, which makes the sound.

Have fun, but don't blow your engine!

220	57
420	92
640	35
800	44
END	115

The listing:

```
10 POKE65495,0
20 PMODE1,1:SCREEN1,0:PCLS:RESTO
RE
30 DRAW"S8"
40 N$(1)="BR2D4"
50 N$(2)="R2D2L2D2R2"
60 N$(3)="R2D2L2R2D2L2"
70 N$(4)="D2R2U2D4"
80 N$(5)="R2L2D2R2D2L2"
90 N$(6)="R2L2D4R2U2L1"
100 N$(7)="R2D4"
110 N$(8)="R2D2L2U2D4R2U2"
120 N$(9)="R2D2L2U1BD3R2U1"
130 N$(0)="R2D4L2U4"
140 G$="R2BD2L1F1G1L1H1U2"
150 S$="R2L2D2R2D2L2"
160 P$="R2D2L2U1D3"
170 H$="D4BR2U2L1R1U2"
180 COLOR2,1
190 DRAW"BM0,2R1D4L1BM4,4R19F3D1
2R26E8R59F2D2G4L22D1L2D11R1D1R30
"
200 DRAW"F2D53G2L4H2U36H6G6D29G4
L87H1U36E2R3F2D23F4R64E2R1E2R1E2
"
210 DRAW"U1H2L1H2L1H1L57H2U2E2R8
E1R3E1R3E1R3E1R3E1R3E1R21E3H12L7
0"
220 DRAW"BM4,8R17F3D11F1R29E8R56
D1G3L22G2D13F2R29F2D49G2H2"
230 DRAW"U36H6L4G6D29G4L83H1U32E
1R1F1D24F3R69E2R1E2R1E3U3H3L1H2"
240 DRAW"L1H1L57H1E1R7E1R4E1R3E1
R3E1R3E1R3E1R21E3U4H12L72"
250 DRAW"BM0,60R1D4L1"
260 PAINT(4,6),2,2
270 DRAW"C4"
280 READ A,B,C
290 DRAW"BM"+STR$(A)+","+STR$(B)
+N$(C)
300 IF B=50 AND C=5 THEN 320
310 GOTO 280
320 DRAW"C4BM46,190U7R75D7L1U6L7
3D6"
330 DRAW"U6R15D6R1U6R26D6R1U6"
340 DRAW"C4BM54,182; XG$;BM62,18
6R1"
350 DRAW"BM84,182; XS$;BM92,182;
 XP$;BM100,186R1"
360 DRAW"BM138,182; XH$;BM146,18
2; XP$;BM154,186R1"
370 DRAW"C3BM16,14R1F2D1G2L1H2U1
E2"
380 DRAW"BM+0,+8R1F2D1G2L1H2U1E2
"
390 DRAW"BM+0,+8R1F2D1G2L1H2U1E2
"
400 PAINT(16,18),2,3:PAINT(16,34
),2,3:PAINT(16,50),2,3
410 PAINT(50,180),2,4:PAINT(82,1
80),2,4:PAINT(138,180),2,4
420 FORN=1TO3000:NEXT
430 PSET(4,6,3):COLOR3,2:S=4:X=7
5
440 FORSS=1TO3:ZZ=JOYSTK(0)
450 PAINT(16,16*SS),S,3
460 SOUNDX,15
470 J=JOYSTK(1):IF J<15 THEN 400
480 IF SS=2 THEN S=1:X=10
490 NEXTSS
500 G=1:SP=0:HP=0:TI=0
510 COLOR3,2
520 H=4:V=6
530 READ A,B,N,ST:FORX=1TON
540 P=PEEK(65280):IFP=126 OR P=2
54 THEN 550 ELSE 580
550 XX=JOYSTK(0):J=JOYSTK(1):IFJ
<25 THEN G=G+1 ELSE G=G-1
560 IF G<1 THEN G=1 ELSE IFG>4 T
HEN G=4
570 SOUND20,1:IF SP<(G-1)*25 THE
N 840
580 XX=JOYSTK(0):J=JOYSTK(1):IFJ
<15 THEN SP=SP+G:GOTO600
590 IFJ>53 THEN SP=SP-(5-G)*4
600 HP=(4.5-G)*50*SP:IF HP>8000
THEN 840
610 IF HP<0 THEN HP=0
620 IF SP<0 THEN SP=0
630 TI=TI+100-SP
640 PAINT(50,180),2,4:PAINT(82,1
80),2,4:PAINT(138,180),2,4:DRAW"
BM68,182; XN$(G);"
650 SA=INT(SP/100):SB=INT(SP/10-
SA*10):SC=INT(SP/1-SB*10-SA*100)
:HA=INT(HP/1000):HB=INT(HP/100-H
A*10):HC=INT(HP/10-HB*10-HA*100)
:HD=INT(HP/1-HC*10-HB*100-HA*100
0)
660 DRAW"BM106,182; XN$(SA);BM11
4,182; XN$(SB);BM122,182; XN$(SC
);BM160,182; XN$(HA);BM168,182;
XN$(HB);BM176,182; XN$(HC); BM18
4,182; XN$(HD);"
670 SOUNDHP/40+1,1:IF ST<>0 AND
```

* COLOR COMPUTER WORD PROCESSOR *

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ART DISK #2 — **each $19.95***
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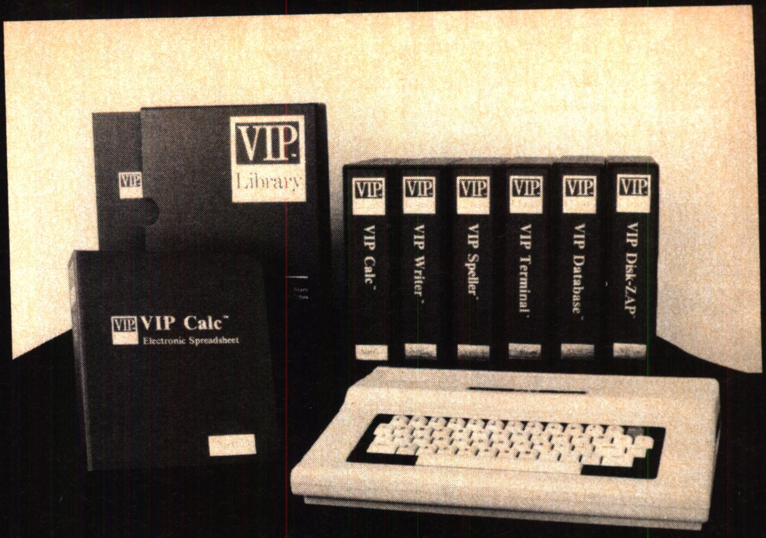
GRAPHICOM - TM of Cheshire Cat Computer Creations
TRS-80 COLOR COMPUTER - TM of Tandy Corporation

```
SP>ST THEN 870
680 PRESET(H,V):H=H+A*2:V=V+B*2:
PSET(H,V,3):NEXTX:IFH=4 AND V=64
 THEN 740 ELSE 530
690 RETURN
700 PRINT:PRINT"WANT TO PLAY AGA
IN?"
710 A$=INKEY$:IF A$=""THEN 710
720 IF A$="Y" THEN 20
730 END
740 CLS:PRINT:PRINT"C O N G R A
D U L A T I O N S !"
750 PRINT:PRINT"YOU FINISHED THE
 COURSE."
760 PRINT"YOUR TIME WAS:";TI*.10
0
770 GOTO700
780 DATA 88,18,7,96,18,0,236,8,4
,244,8,5,156,28,6,164,28,5,184,4
8,6,192,48,5,238,48,6,246,48,5
790 DATA 232,178,4,240,178,5,212
,70,6,220,70,0,210,154,7,218,154
,0,18,168,6,26,168,0,0,88,4,8,88
,5,46,132,7,54,132,0
800 DATA 160,128,6,168,128,5,48,
96,4,56,96,0,84,86,9,92,86,0,176
,86,5,184,86,0,140,50,7,148,50,5
810 DATA1,0,18,0,1,1,3,65,0,1,11
,0,1,1,1,60,1,0,27,0,1,-1,8,70,1
,0,57,0,1,1,2,45,-1,1,4,45,-1,0,
21,0,-1,1,1,65,-1,0,1,65,-1,1,1,
65,0,1,11,0,1,1,2,65,1,0,29,0,1,
1,2,65,0,1,51,0,-1,1,2,45,-1,0,2
,45,-1,-1,2,45,0,-1,36,0
820 DATA-1,-1,6,60,-1,0,2,60,-1,
1,6,60,0,1,29,0,-1,1,4,70,-1,0,8
5,0,-1,-1,1,60,0,-1,34,0,1,-1,2,
45,1,0,1,45,1,1,2,45,0,1,23,0,1,
1,4,70,1,0,65,0,1,-1,2,65,1,0,1,
65,1,-1,2,65,1,0,1,65,1,0,1,65,1
,-1,3,65,0,-1,1,65,-1,-1,3,65,-1
,0,1,65,-1,-1,2,65,-1,0,1
830 DATA65,-1,-1,1,65,-1,0,57,0,
-1,-1,2,40,1,-1,2,40,1,0,8,0,1,-
1,1,90,1,0,3,90,1,-1,1,90,1,0,3,
90,1,-1,1,90,1,0,3,90,1,-1,1,90,
1,0,3,90,1,-1,1,90,1,0,3,90,1,-1
,1,90,1,0,21,0,1,-1,3,50,0,-1,2,
50,-1,-1,12,75,-1,0,71,0
840 CLS:PRINT:PRINT"B O O O O M
M ! !"
850 PRINT:PRINT"YOU BLEW YOUR EN
GINE."
860 GOTO700
870 CLS:PRINT:PRINT"C R A S H !
! !"
880 PRINT:PRINT"YOU WERE GOING T
O FAST AROUND   THAT TURN."
890 GOTO700
```

VIP™ Library



Available By Express Order At Your Local Radio Shack® Store!

The Library Concept

State of the Art, Quality, Integrity, Compatibility and Affordability. Five things good software must possess. Five things that epitomize the **VIP Library™**. Each program is the diamond of its class, true excellence. These programs are first in features, first in power, first in memory, and all are affordably priced.

State Of The Art

All **Library** programs are written in machine code specifically for the Color Computer, to work without the interference of a separate operating system such as FLEX. From this comes speed and more workspace for you. Unlike other programs for the Color Computer which are said to be 64K compatible, **VIP Library™** programs are not limited to between 24 and 30K of workspace in 64K. **Library** programs have Memory Sense with BANK SWITCHING to fully use all 64K, thus giving up to 51K with a disk version and up to 53K with a tape version.

Easy To Use

Each **Library** program was carefully designed to be extremely easy to use. Built-in on-screen help tables are at your fingertips, as are menus of all kinds. Every effort is made to use logical, intuitive and easy-to-remember commands. The manuals have been thoughtfully prepared to cover every aspect of the program, and they have complete tutorials to get you going right away. We set the standard!

Lowercase Displays

State-of-the-Art graphics allow instant use of four display colors, and eight lowercase displays featuring descending lowercase letters. You can select from 51, 64 or 85 columns by 21 or 24 lines per screen, with wide or narrow characters in the 64 display. These screens provide a pleasant and relaxing way to perform your tasks, with as much text on the screen as is possible. Each program is easy to learn and a joy to use. We take pride in the stringent testing done to make these programs perform flawlessly. Every feature, every convenience, sleek, simple and elegant.

> *". . . PICTURE getting your instantaneous investment report over the phone, using it in your spreadsheet calculation, generating a report, and writing a memo including that report and data from your database with your word processor, and all this with VIP Library™ programs . . ."*

Total Compatibility

All **Library** programs are compatible. Transfer and use of files between programs is easy and carefree. What's better, when you have learned one program the others will come easy. And every program is the best of its kind available.

The Library Programs

For your writing needs is the **VIP Writer™**, and its spelling checker, the **VIP Speller™**. For financial planning and mathematical calculations you can use the **VIP Calc™**. To manage your information and send multiple mailings there is the **VIP Database™**. For sending all these files to and from home or the office and for talking to your friends you can have the **VIP Terminal™**. Finally, to fix disks to keep all your **Library** files in good repair we offer the **VIP Disk-ZAP™**.

Mini Disk Operating System

The Disk versions each have a Mini Disk Operating System which will masterfully handle from 1 to 4 drives. It offers smooth operation for such features as the ability to read a directory, display free space on the disk, kill files, save and automatically verify files, and load, rename and append files. **Library** programs simply do not have the limitations of BASIC.

Professionalism

Each volume of the **Library** is beautifully bound in a cloth-bound, gold embossed binder, and comes with a matching slipcase to protect your investment.

The **Library** will grace your work area with the professionalism it deserves. Welcome the **VIP Library™** into your home and office.

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VIP Writer

Includes VIP Speller at no additional cost!!

By Tim Nelson

RATED TOPS IN RAINBOW, HOT COCO, COLOR COMPUTER MAGAZINE & COMPUTER USER

The most powerful and easy-to-use word processor is available in the showpiece and workhorse of the **Library: The VIP Writer™**. Because of its undisputed superiority over all Color Computer word processors, it was selected by Dragon Data Ltd. of England and TANO in the U.S., to be the Official Word Processor for their line of Dragon microcomputers.

The result of two years of research, the **VIP Writer™** offers every feature you could desire from a word processor. It is the most powerful, fastest, most dependable and most versatile. With the hi-res display, workspace and compatibility features built into the **Library** the **Writer** is also the most usable.

". . . Nearly every feature and option possible to implement on the Color Computer. The design of the program is excellent; the programming is flawless." October 1983 "Rainbow"

"Among word processors for the CoCo, VIP Writer stands alone as the most versatile, most professional program available." May 1984 "Computer User"

"Word processing with VIP Writer is like driving a high-performance vehicle . . . This Ferarri of a package has more features than Telewriter, Easywriter (for the IBM PC), or Applewriter." October 1983 "Hot CoCo"

The **Writer** will work with you and your printer to do things you always wanted to do. Every feature of your printer can be put to use, every character set, every graphics capability at any baud rate, EVEN PROPORTIONAL SPACING. All this with simplicity and elegance. You can even automatically print multiple copies.

Although all versions feature tape save and load, the disk version provides the Mini Disk Operating System common to the whole **Library**, plus disk file linking for continous printing.

Professional features of particular note:

- Memory-Sense with **BANK SWITCHING** to fully utilize 64K, giving not just 24 or 30K, but up to 53K of workspace with the tape version and 50K with the disk version.
- TRUE FORMAT WINDOW allowing you to preview the printed page ON THE SCREEN BEFORE PRINTING, showing centered lines, headers, FOOTNOTES, page breaks, page numbers, & margins in line lengths of up to 240 characters. It makes HYPHENATION a snap.
- A TRUE EDITING WINDOW in all 9 display modes for those extra wide reports and graphs (up to 240 columns!).
- FREEDOM to imbed any number of PRINTER CONTROL CODES anywhere, **EVEN WITHIN JUSTIFIED TEXT.**
- Full 4-way cursor control, sophisticated edit commands, the ability to edit any BASIC program or ASCII textfile, SEVEN DELETE FUNCTIONS, LINE INSERT, LOCATE AND CHANGE, wild card locate, up to TEN SIMULTANEOUS block manipulations, word wrap around, programmable tabs, display memory used and left, non-breakable space, and headers, footers and FOOTNOTES.
- Automatic justification, automatic pagination, automatic centering, automatic flush right, underlining, superscripts, subscripts, pause print, single-sheet pause, and print comments.
- Type-ahead, typamatic key repeat and key beep for the pros, ERROR DETECTION and UNDO MISTAKE features, 3 PROGRAMMABLE functions, auto column creation, and an instant on-screen HELP TABLE.

Radio Shack Catalog No. 90-0141

32K (Comes with tape & disk) $69.95

VIP Writer — VIP Speller Combo comes in VIP Writer Binder.

VIP Speller™

WITH A 50,000 WORD INDEXED DICTIONARY!

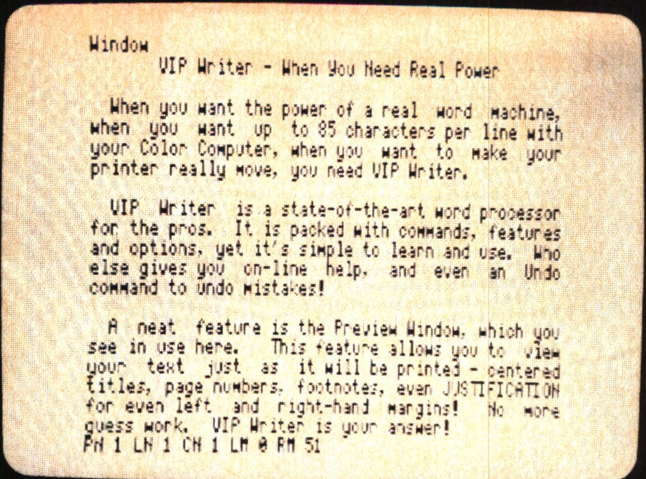
By Bill Argyros

Gone are the eyestrain, boredom and fatigue from endless proofreading. **VIP Speller™** is the fastest and most user-friendly speller for your CoCo. It can be used to correct any ASCII file — including **VIP Library™** files and files from **Scripsit™** and **Telewriter™**. It automatically checks files for words to be corrected, marked for special attention or even added to the dictionary. You can even view the word in context, with upper and lowercase. **VIP Speller™** comes with a specially edited 50,000 word dictionary which, unlike other spellers for the CoCo, is indexed for the greatest speed. The shorter your file, the quicker the checking time. And words can be added to or deleted from the dictionary or you can create one of your own. **VIP Speller™** also comes with the **Library's** mini disk operating system.

Radio Shack Catalog No. 90-0142

32K DISK ONLY $49.95

Lowercase displays not available with this program.



```
Window
      VIP Writer - When You Need Real Power

  When you want the power of a real  word  machine,
when  you  want  up  to 85 characters per line with
your Color Computer, when you  want  to  make  your
printer really move, you need VIP Writer.

  VIP  Writer  is a state-of-the-art word processor
for the pros.  It is packed with commands, features
and options, yet it's simple to learn and use.  Who
else gives you  on-line  help,  and  even  an  Undo
command to undo mistakes!

  A  neat  feature is the Preview Window, which you
see in use here.   This feature allows you to  view
your  text  just  as  it will be printed - centered
titles, page numbers, footnotes, even JUSTIFICATION
for even left  and  right-hand  margins!  No  more
guess work.  VIP Writer is your answer!
PN 1 LN 1 CN 1 LM 0 RM 51
```

VIP Calc™

By Kevin Herrboldt

You can forget the other toy calcs — The real thing is here! No other spreadsheet for the Color Computer gives you:

- **20 ROWS BY 9 COLUMNS ON THE SCREEN AT ONCE**
- **LOWERCASE LETTERS WITH DESCENDERS**
- **UP TO 16 CONCURRENT DISPLAY WINDOWS**
- **FLOATING-POINT MATH**
- **CHOICE OF SINGLE AND DOUBLE PRECISION**
- **WORKS WITH BASE 2, 10, AND 16 NUMBERS**
- **UP TO 512 COLUMNS BY 1024 ROWS**
- **USER DEFINABLE WORKSHEET SIZE FOR MORE MEMORY**
- **LOCATE FUNCTION TO FIND CHECK NUMBERS, NAMES, ETC.**
- **COLUMN/ROW MULTIPLE SORTS**
- **PROGRAMMABLE FUNCTIONS**
- **IMBEDDABLE PRINTER CONTROL CODES**
- **21 ALTERABLE PRINT FORMAT PARAMETERS**
- **ON-LINE HELP TABLES**
- **DOES NOT REQUIRE FLEX OR BASIC**

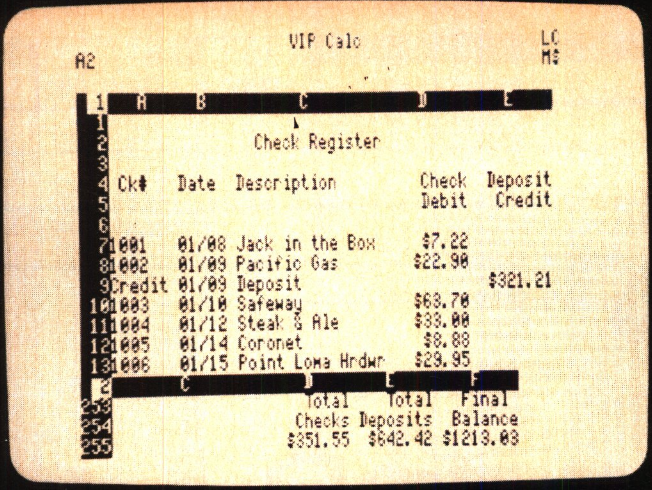
VIP Calc™ is truly the finest and easily the most powerful electronic worksheet and financial modeling program available for the Color Computer. Now every Color Computer owner has access to a calculating and planning tool better than VisiCalc™, containing all its features and commands and then some, WITH USABLE DISPLAYS. Use Visicalc templates with **VIP Calc™!**

There's nothing left out of **VIP Calc™**. Every feature you've come to rely on with VisiCalc™ is there, and then some. You get up to **5 TIMES** the screen display area of other spreadsheets for the Color Computer and Memory-Sense with **BANK SWITCHING** to give not just 24, or 30, but **UP TO 33K OF WORKSPACE IN 64K!!!** This display and memory allow you the FULL SIZE, USABLE WORKSHEETS you require. You also get: User definable worksheet size, up to 512 columns by 1024 rows! * Up to **SIXTEEN VIDEO DISPLAY WINDOWS** to compare and contrast results of changes * **16 DIGIT PRECISION** * Sine, Cosine and other trigonometric functions, Averaging, Exponents, Algebraic functions, and **BASE 2, 8, 10 or 16** entry * Column and Row, Ascending and Descending **SORTS** for comparison of results * **LOCATE FORMULAS OR TITLES IN CELLS** * Easy entry, replication and block moving of frames * Global or Local column width control up to 78 characters width per cell * Create titles of up to 255 characters per cell * Limitless programmable functions * Typamatic Key Repeat * Key Beep * Typeahead * Print up to 255 column worksheet * Prints at any baud rate from 110 to 9600 * Print formats savable along with worksheet * Enter PRINTER CONTROL CODES for customized printing with letter quality or dot matrix printer * Combine spreadsheet tables with **VIP Writer™** documents to create ledgers, projections, statistical and financial reports and budgets. Both versions feature Tape save and load, but the disk version also has the Mini Disk Operating System of the entire **Library.**

Radio Shack Catalog No. 90-0143

32K (Comes with tape & disk) $69.95

32K does not have hi-res displays, sort or edit.



```
                    VIP Calc                              LC
A2                                                        M$

 1   A      B          C                  D       E
 1
 2                 Check Register
 3
 4 Ck#    Date  Description             Check   Deposit
 5                                      Debit    Credit
 6
 71001   01/08 Jack in the Box          $7.22
 81002   01/09 Pacific Gas             $22.90
 9Credit 01/09 Deposit                          $321.21
101003   01/10 Safeway                 $63.70
111004   01/12 Steak & Ale             $33.00
121005   01/14 Coronet                  $8.88
131006   01/15 Point Loma Hrdwr        $29.95
 2           C            D         E         F
253                     Total     Total     Final
254                    Checks  Deposits   Balance
255                   $351.55   $642.42  $1213.03
```

VIP Terminal™

RATED BEST IN JANUARY 1984 "RAINBOW"

By Dan Nelson

From your home or office you can join the communication revolution. The **VIP Terminal™** opens the world to you. You can monitor your investments with the Dow Jones Information Service, or broaden your horizons with The Source of CompuServe, bulletin boards, other computers, even the mainframe at work.

For your important communication needs you've got to go beyond software that only lets you chat. You need a smart termnal so that you can send and receive programs, messages, even other **VIP Library™** files. **VIP Terminal™** has "more features than communications software for CP/M, IBM and CP/M 86 computers." Herb Friedman, Radio Electronics, February 1984.

FEATURES: Choice of 8 hi-res lowercase diplays * Memory-Sense with BANK SWITCHING for full use of workspace * Selectively print data at baud rates from 110 to 9600 * Full 128 character ASCII keyboard * Automatic graphic mode * Word mode (word wrap) for unbroken words * Send and receive **Library** files, Machine Language & BASIC programs * Set communications baud rate from 110 to 9600, Duplex: Half/Full/Echo, Word length: 7 or 8, Parity: Odd/Even or None, Stop Bits: 1-9 * Local linefeeds to screen * Save and load ASCII files, Machine Code & BASIC programs * Lowercase masking * 10 Keystroke Multiplier (MACRO) buffers to perform repetitive pre-entry log-on tasks and send short messages * Programmable prompt or delay for send next line * Selectable character trapping * Send up to ten short messages (KSMs), each up to 255 characters long, automatically, to save money when calling long distance.

All versions allow tape load and save of files and KSMs, but the disk version also has the Mini Disk Operating System.

Radio Shack Catalog No. 90-0139

32K (Comes with tape & disk) $49.95

(Tape comes in 16K but without hi-res displays)

Available By Express Order At Your Local Radio Shack® Store!

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VIP Database™

"ONE OF THE BEST" JULY 1984 "RAINBOW"

By Tim Nelson

This high speed MACHINE LANGUAGE program fills all your information management needs, be they for your business or home. And it does so better than any other database program for the Color Computer, featuring machine code, lowercase screens and mailmerge capabilities. Inventory, accounts, mailing lists, family histories, you name it, the **VIP Database™** will keep track of all your data, and it will merge **VIP Writer™** files.

The **VIP Database™** features the **Library** Memory Sense with BANK SWITCHING and selectable lowercase displays for maximum utility. It will handle as many records as fit on your disk or disks. It is structured in a simple and easy to understand menu system with full prompting for easy operation. Your data is stored in records of your own design. All files are fully indexed for speed and efficiency. Full sort of records is provided for easy listing of names, figures, addresses, etc., in ascending or descending alphabetic or numeric order. Records can be searched for specific entries, using multiple search criteria. With database form merge you may also combine files, sort and print mailing lists, print "boiler plate" documents, address envelopes - the list is endless. The math package even performs arithmetic operations and updates other fields. Create files compatible with the **VIP Writer™** and **VIP Terminal™**. Unlimited print format and report generation with the ability to imbed control codes for use with all printers.

As with all other **Library** programs, the **Database** features the powerful Mini Disk Operating System.

Radio Shack Catalog No. 90-0140

32K DISK $59.95

64K Required for math package & mail merge

VIP Disk-ZAP™

RAVED ABOUT IN THE APRIL 1983 "RAINBOW!"

By Tim Nelson

Your database file disk, form letter disk, or BASIC program disk goes bad. An I/O error stops loading, or even backing up of the disk. Weeks, even months of work sit on the disk, irretrievable. Now catastrophic disk errors are repairable, quickly and with confidence, using the **VIP Disk-ZAP™**. It is the ultimate repair utility for simple and quick repair of all disk errors. Designed with the non-programmer in mind, the **VIP Disk-ZAP™** will let you retrieve all types of bashed files, BASIC and Machine Code programs.

This high-speed machine code disk utility has a special dual cursor screen display to look at the data on your disk. You are able to: Verify or modify disk sectors at will * Type right onto the disk to change unwanted program names or prompts * Send sector contents to the printer * Search the entire disk for any grouping of characters * Copy sectors * Backup tracks or entire disks * Repair directory tracks and smashed disks * Full prompting to help you every step of the way * 50-plus page Operators Manual which teaches disk structure and repair.

Radio Shack Catalog No. 90-0144

16K DISK $49.95

Lowercase displays not available with this program.

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Order Status and Software Questions call (805)968-4364

MAIL ORDERS: $3.00 U.S. Shipping per product ($5.00 CANADA; $10.00 OVERSEAS). Personal checks allow 3 weeks.

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Goleta, California 93117 U.S.A.

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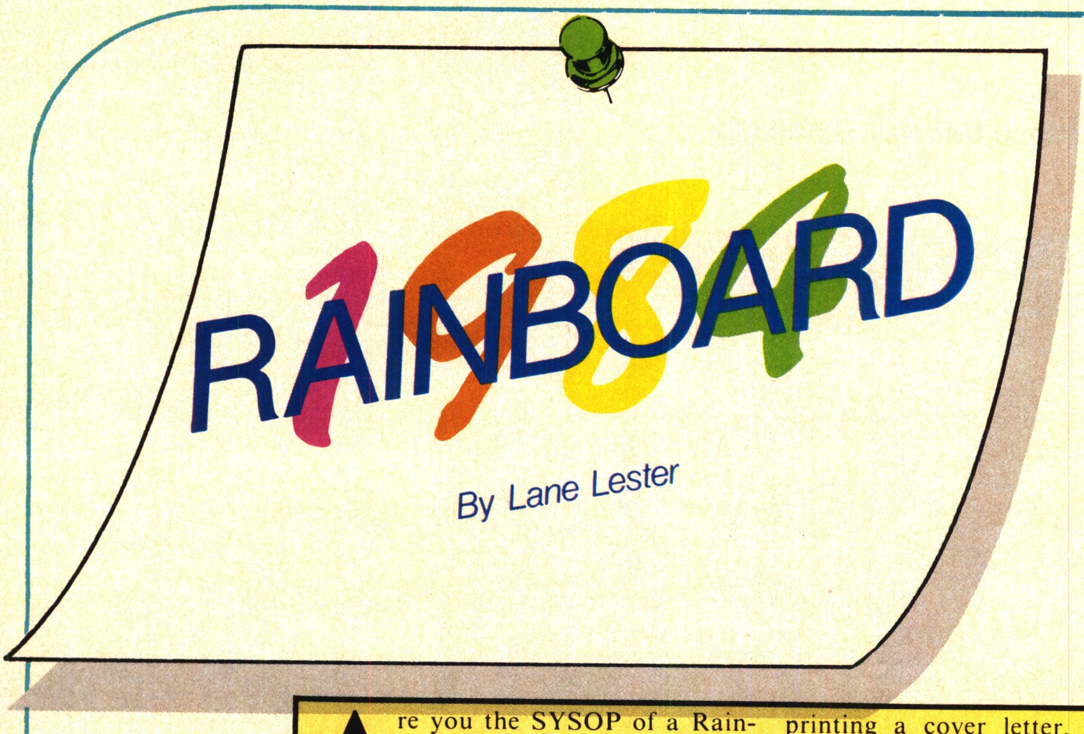

RAINBOARD 1984

By Lane Lester

Are you the SYSOP of a RainBoard? Have you called a RainBoard yet? Do you know what a RainBoard is? Last November's issue of THE RAINBOW was also a data communications issue, and I was pleased to present a set of programs to enable you to run your own bulletin board system. The RainBoard provides not only the usual functions such as message exchange, text files to read, and programs to download; it also, in keeping with its name, provides color graphics and begins each session with a picture of a rainbow ending in a pot of gold with the message, "WELCOME TO THE RAINBOARD, WITH A RAINBOW OF COLOR AND A POT OF GOLD IN GOOD TIMES!" Also included in that same issue was Dan Downard's machine language program that interfaced my BASIC programs to the CoCo's RS-232 port.

Almost as an afterthought, I placed at the end of the article an offer of a disk with all of the programs and files needed to run your own RainBoard. The price of $20 was what I figured would take care of the nuisance and expense of printing a cover letter, copying the RainBoard disk, and mailing it. In addition to the hundreds of copies of RAINBOW ON TAPE that were sold for that issue, I have now sent out over 80 copies of the RainBoard disk, and the orders continue to come in. I have also been besieged by telephone calls from all over the United States and Canada from folks who have typed in the programs and either had problems or just want to chat about running a bulletin board. Evidently BBSing is one of the hottest new uses for personal computers.

In addition to the RainBoards scattered all over the United States, including one in Hawaii being SYSOPed by a retired longshoreman, the most colorful BBS in the world has now gone international. Somewhere in the Pacific, a U.S. Navy ship's computer users are communicating colorfully. Known RainBoards are in Canada and Australia, and not only in English-speaking countries. In August, I received a disk from Dr. Joao Araujo, Rio de Janeiro, Brazil, containing a Portuguese version. They have a 200-member CoCo club and have translated the software (the text portions — the programs are still in BASIC) for a BBS to support their club.

I think one of the major attractions of the RainBoard was that it provided a

---

(Lane Lester is professor of biology at Liberty Baptist College and holds the M.S. in ecology and the Ph.D. in genetics.)

breakthrough in the cost of starting up one's own board. In the past, prospective SYSOPs had to plan on spending several hundred dollars for an auto-answer modem, about a thousand on two or more disk drives, and over a hundred on BBS software. The RainBoard software is inexpensive (only the back-issue price of THE RAINBOW, if you feel like doing some typing), it only requires one drive, and auto-answer modems are now available for about $100. [Look elsewhere in this issue for a hardware project to convert your Modem 1 to auto-answer.]

Has a program ever been written without bugs? Not any of mine, and *RAINBORD/BAS* was no exception. Most of the bugs were cornered before the November 1983 issue was published, but one particularly troublesome one got through. Another RainBoard SYSOP had to call it to my attention, and it was the result of my fondness for eight-character filenames. The routines that search the disks for files use DSKI$ to look at the directory track, and would not find any files with shorter names. So at the end of lines 1030 and 1160 one needs to add:

FILE$ = LEFT$(FILE$+STRING$(7,32),8)

to pad out the filename with as many blank spaces as needed. There are plenty of ways this could be accomplished, but I'm indebted to Mel Hefter, the genius behind Custom Software Engineering, for this elegant approach. Another bug that was corrected in a later RAINBOW was a single byte in Dan Downard's *REMOTE/BIN*, which set the Baud rate incorrectly in the machine language driver. The correct value at $3F01 is $B8, and the easiest way to handle this if you get it on a back issue of RAINBOW ON TAPE is to *LOADM* the program, enter *POKE &H3F01,&HB8,* and then *SAVEM* the corrected program.

> ***"I think one of the major attractions of the RainBoard was that it provided a breakthrough in the cost of starting up one's own board."***

Although I did, at one time, operate a RainBoard I had to do it with my only CoCo and on a shared telephone line. So, when our town got a 24-hour BBS, I closed the RainBoard down, and have continued to enjoy BBSing as a caller of that board and others around the country. I would love to give you the phone number of our local board in hopes of communicating with some of you, but we have had a phenomenal run of bad luck with the equipment. In addition to the usual kinds of glitches, the equipment was once totally destroyed by lightning. We are also plagued by a "cracker," one of those perverts who derive pleasure from destroying other people's systems. Anyway, I'm afraid that any number I might give you would no longer be in operation. If you would like to see a RainBoard in action, you may call either (813) 321-0397 or (412) 654-0445.

For jaded RainBoard SYSOPs, or for anyone who needs a little more encouragement, here's a new feature that can be added to the RainBoard. The original version kept the entire membership list in RAM, limiting the size. The patch (called *PATCH/BAS*) which follows provides for a direct access member file of up to 300 members. *INITMEMB/BAS* initiates the file, *EDITOR/BAS* edits the file, and *SYSOP2/BAS* replaces the original *SYSOP/BAS*. These new routines are the products of my computing colleague, Erik Gavriluk, who helped me immensely in getting the original RainBoard in shape.

In case you've decided you'd like to operate your own RainBoard, you can send $20 to Lane Lester, 413 Woodland Circle, Lynchburg, VA 24502 for a disk containing all the programs you need, plus documentation and text files to show the kinds of things that are usually included. Alternately, if you weren't a RAINBOW subscriber last year, back issues of both the November 1983 magazine and the companion RAINBOW ON TAPE are available from THE RAINBOW and, together, these contain the bare necessities you need to set up your own bulletin board.

Either way, you can quickly and easily become the SYSOP of your own system.

171 125
1262 147
END 14

Listing 1

```
0 ' PATCH, BY ERIK GAVRILUK
1 ' ENABLES RANDOM ACCESS MEMBER
SHIP FILE FOR THE RAINBOARD.
2 ' REMARK FOLLOWING THE LINE EX
PLAINS WHAT SHOULD BE DONE,
3 '     ,E.G., CHANGED = CHANGE T
HIS LINE TO READ...ETC.
4 ' IF NOTHING ELSE IS LISTED AF
TER A LINE, INSERT THAT LINE.
5 ' THIS FILE CAN BE MERGED WITH
 THE EXISTING RAINBORD/BAS.
6 ' RUN INITMEMB/BAS BEFORE USIN
G THIS NEW MODIFIED RAINBOARD.
20 GOTO 1700'CHANGED
70 CLEAR5000:DIMDISPLAY$(46),TEX
T$(70)'Modified line
100 CLS:PRINT"RAINBOARD IS READY
 TO RECEIVE!"'Replace
131 LINE INPUT"ARE YOU USING A T
RS-80 COCO (Y/N)?";CC$:IF CC$="N
" OR CC$="n" THEN BITS=7:GOTO 15
0'Insert line
132 IF CC$="Y" OR CC$="y" THEN 1
40 ELSE 131'Insert line
170 CLOSE:PRINT"PRESS ENTER TO B
ECOME A MEMBER":LINE INPUT"OR TY
PE YOUR LOGON NUMBER:";LN$:IF LN
$="" THEN 1500 ELSE V=VAL(LN$):I
F V<1 THEN 170 ELSE IF V>300 THE
N 170'Replace
171 OPEN"D",#1,"MEMBERS/TXT",25:
FIELD 1,16 AS NM$,6 AS PW$,3 AS
IN$:GET #1,V'INSERT
```

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MONITOR TAPE: A cassette tape which allows you to directly access memory, I/O and registers with a formatted hex display. Great for machine language programming, debugging and learning. It can also send/receive RS232 at up to 9600 baud, including host system download/upload. 19 commands in all. Relocatable and reentrant. **CBUG TAPE: $29.95**

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```
172 I$=IN$:LINE INPUT"ENTER YOUR
 PASSWORD:";P$:IF P$=PW$ THEN NA
ME$=NM$:PRINT"HELLO, "NAME$" ("I
$")":GOTO 210 ELSE 170'INSERT
210 INIT$=I$:CLOSE:PRINT"CHECKIN
G FOR MESSAGES.":C=1:GOSUB650:GO
TO360'Modified line
700 MSG$="WOULD YOU LIKE"+CHR$(1
3)+"TO REPLY TO THIS (Y/N)? ":GO
SUB40:IFC$="Y"THENGOSUB740'MODIF
IED
710 NEXTL,K:IFCD THENRETURNELSEP
RINT"SORRY, NO MESSAGES FOUND.":
RETURN'CHANGED
770 PRINT"WE NEED 3 LETTERS.":GO
TO 760'CHANGED
810 IFLEN(S$)>8THENPRINT"8 LETTE
R MAXIMUM, "NAME$:GOTO 800'CHANG
ED
820 IFINSTR(S$,":")ORINSTR(S$,"0
")ORINSTR(S$,"/")ORINSTR(S$,".")
THENPRINT"PLEASE DO NOT USE: 0 .
 : /":GOTO 800'CHANGED
900 PRINTSTRING$(3,7)"THAT LINE'
S TRUNCATED TO:"'CHANGE
1260 PRINTTAB(6)"***THE RAINBIRD
S***"'CHANGED
1261 OPEN"D",1,"MEMBERS/TXT",25:
FIELD 1,16 AS NM$,6 AS PW$,3 AS
I$'INSERT
1262 FOR X=1 TO 300:GET #1,X:IF
PW$=STRING$(6,32) THEN CLOSE:RET
URN ELSE PRINTNM$;"(";I$;")":NEX
T X:CLOSE:RETURN:'INSERT
1410 MBR=0:OPEN"D",1,"MEMBERS/TX
T:0",25:FIELD 1,16 AS NM$,6 AS P
W$,3 AS IN$:FOR X=1 TO 300:GET #
1,X:IF PW$=STRING$(6,32) THEN CL
OSE:RETURN ELSE IF I$=IN$ THEN M
BR=-1:CLOSE:RETURN ELSE NEXT:CLO
SE:RETURN
1420 NEXT:CLOSE:RETURN
1450 PCLEAR1:GOTO 70'DELETE
1500 OPEN"D",1,"MEMBERS/TXT",25:
FIELD 1,16 AS NM$,6 AS PW$,3 AS
IN$
1501 LINE INPUT"ENTER YOUR FULL
NAME:";N$
1502 LINE INPUT"ENTER 3 INITIALS
 WE SHOULD ADDRESS MAIL TO:";I$:
IF LEN(I$)<>3 THEN PRINT"THREE L
ETTERS":GOTO 1502
1503 PRINT"WORKING .. PLEASE WAI
T"
1504 FOR X=1 TO 300:GET #1,X:IF
LEFT$(NM$,LEN(N$))=N$ THEN 1509
ELSE IF IN$=I$ THEN 1510 ELSE IF
 PW$=STRING$(6,32) THEN 1505 ELS
```

Rainboard In Brazil

This is a photo of our Rainboard BBS setup which is on the air from 8 p.m. to 12 p.m. by phone (021) 246-2938, daily.

The system is actually made by two TEAC 80-track double density drives with a J & M disk controller, J-Cat Bell Auto-Answer modem and a 64K Color Computer ('F' Board).

We're over 30 users up today, spread all over the country, but we're hoping to increase this number a lot after this, since THE RAINBOW is the most known CoCo magazine in Brazil and is undoubtedly the CoCo user's bible all over the world.

Joao Roberto Amin Araujo
Rua General Polidoro 288 Casa 9
Botafogo, Rio De Janeiro, 22280
Brazil

```
E NEXT X
1505 LINE INPUT"ENTER SIX LETTER
S FOR A PASSWORD:";P$
1506 IF LEN(P$)<>6 THEN PRINT"SI
X LETTERS PLEASE":GOTO 1505
1507 LSET NM$=N$:LSET PW$=P$:LSE
T IN$=I$:PUT #1,X:CLOSE:PRINT"YO
UR LOGON NUMBER IS";X
1508 NAME$=N$:GOTO 210
1509 PRINT"SOMEONE ALREADY HAS T
HIS NAME":GOTO 1511
1510 PRINT"SOMEONE CURRENTLY HAS
 THESE INITIALS"
1511 PRINT"PLEASE TRY AGAIN":GOT
O 1501
1700 PCLEAR 1:GOTO 70
```

Listing 2

```
10 ' Program to initialize rando
m access
20 ' Membership file for RAINBOR
D/BAS
30 ' BY ERIK GAVRILUK
40 CLS:PRINT"INITIALIZING MEMBER
S/TXT FILE."
50 OPEN"D",#1,"MEMBERS/TXT:0",25
60 FIELD 1,16 AS NM$,6 AS PW$,3
AS IN$
70 FOR X=1 TO 300:LSET NM$=STRIN
G$(16,32):LSET PW$=STRING$(6,32)
:PUT #1,X:NEXT X
80 CLOSE #1
90 PRINT"FILE INITIALIZED.. YOU
HAVE ROOM FOR 300 USERS"
```

Listing 3

```
5 'EDITOR - BY ERIK GAVRILUK
10 CLS:PRINT"USERSLOG EDITOR FOR
 RAINBOARD"
20 OPEN"D",#1,"MEMBERS/TXT",25:F
IELD 1,16 AS NM$,6 AS PW$,3 AS I
N$
30 REC=1
40 CLS:PRINT"RECORD #"REC:GET #1
,REC
50 PRINT"NAME:"NM$:PRINT"PASSWOR
D:"PW$:PRINT"INITIALS:"IN$
60 PRINT:PRINT"1.NAME,2.PW,3.INI
T,4.NEXT,5.END"
70 LINE INPUT A$:ON VAL(A$) GOTO
 100,200,300,400,500
80 GOTO 60
100 LINE INPUT"NAME:";N$:LSET NM
$=N$:PUT #1,REC:GOTO 40
200 LINE INPUT"PASSWORD:";P$:LSE
T PW$=P$:PUT #1,REC:GOTO 40
300 LINE INPUT"INITIALS:";I$:LSE
T IN$=I$:PUT #1,REC:GOTO 40
400 REC=REC+1:GOTO 40
500 CLOSE:END
```

140 134
END 150

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Listing 4

```
10 'SYSOP PROGRAM
20 CLEAR5000:DIMNAME$(50)
30 CLS:PRINT"ENTER NUMBER OF FUN
CTION:","1. DISPLAY ACTIVITY FIL
E","2. PRINT ACTIVITY FILE","3.
INITIATE ACTIVITY FILE"
40 PRINT"4. DISPLAY MEMBER FILE"
,"5. PRINT MEMBER FILE","6. STAR
T MEMBER FILE","7. REMOVE MEMBER
S","8. KILL OLD MESSAGES","9. EN
D
50 INPUTK:IFK<1ORK>9THEN30ELSEON
K GOSUB60,60,100,110,110,140,160
,210,250:GOTO30
60 IFK=1THENDV=0ELSEDV=-2
70 OPEN"D",1,"ACTIVITY":L=LOF(1)
:PRINT#DV,"CALLERS ="L
80 FORI=1TOL:GET#1,I:INPUT#1,ACT
```

```
$:FORJ=255TO0STEP-1:IFMID$(ACT$,
J,1)=" "THENNEXTJ ELSEACT$=LEFT$
(ACT$,J)
90 PRINT#DV,ACT$:NEXTI:CLOSE:LIN
EINPUT"PRESS ENTER TO CONTINUE";
K$:RETURN
100 KILL"ACTIVITY/DAT":RETURN
110 IFK=4THENDV=0ELSEDV=-2
120 OPEN"D",#1,"MEMBERS/TXT",25:
FIELD 1,16 AS NM$,6 AS PW$,3 AS
IN$
121 FOR I=1 TO 300:GET #1,I:IF P
W$=STRING$(6,32) THEN 130 ELSE P
RINT#DV,NM$;"(";IN$;")";" ==>";P
W$:NEXT I
130 CLOSE:LINEINPUT"PRESS ENTER
TO CONTINUE";K$:RETURN
140 CLS:LINE INPUT"SYSOP NAME:";
NA$:LINE INPUT"INITIALS:";I$:LIN
E INPUT"PASSWORD:";P$:OPEN"D",#1
,"MEMBERS/TXT",25:FIELD 1,16 AS
N$,6 AS PW$,3 AS IN$
141 LSET N$=NA$:LSET PW$=P$:LSET
 IN$=I$:PUT #1,1:LSET PW$=STRING
$(6,32):PUT #1,2:CLOSE
150 RETURN
160 K=4:GOSUB110
170 LINE INPUT"ENTER INITIALS OF
 MEMBER TO      REMOVE, X TO RETU
RN:";I$:OPEN"D",#1,"MEMBERS/TXT"
,25:FIELD 1,16 AS NM$,6 AS PW$,3
 AS IN$
171 FOR X=1 TO 300:GET #1,X:IF I
N$=I$ THEN 175 ELSE NEXT X:CLOSE
:PRINT"NOT FOUND":RETURN
175 LSET PW$="....."+CHR$(255):P
UT #1,X:CLOSE:RETURN
180 WRITE#1,NUM:FORI=1TONUM:WRIT
E#1,NAME$(I):NEXT:CLOSE:RETURN
190 J=1:FORI=1TONUM:IFLEFT$(NAME
$(I),3)=INITS$THENI=I+1:NUM=NUM-
1
200 NAME$(J)=NAME$(I):J=J+1:NEXT
:GOTO170
210 'Kill Old Messages
220 CLS:PRINT"ENTER NUMBER OF CU
RRENT MONTH:":INPUTMONTH
225 FORI=3TO11:DSKI$1,17,I,A$,B$
:A$=A$+LEFT$(B$,120):FORJ=0TO7:S
BJECT$=MID$(A$,J*32+1,8):EXT$=MI
D$(A$,J*32+9,3)
230 A=ASC(SBJECT$):IFA=255THENJ=
7:I=11:GOTO240ELSEIFA=0THEN240
235 IFMID$(EXT$,2,1)="*"OR(LEFT$
(EXT$,1)="A"ANDVAL(RIGHT$(EXT$,2
))<MONTH-1)THENKILLSBJECT$+"/"+E
XT$+":1"
240 NEXTJ,I:RETURN
250 END
```

PRODUCTS FOR THE TRS-80 COLOR COMPUTER®

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- ★ Find a String
- ★ Repeat Find

SCREEN-EDITING
- ★ Change Characters
- ★ Extend a Line
- ★ Kill a Line
- ★ Insert Characters
- ★ Delete Characters
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DATA COMMUNICATIONS

CC Talk: A

16K
ECB

Smart Terminal Package

By Frank Gossette

The capability of any microcomputer for communication with other computers, both large and small, can greatly enhance the power of the machine and its potential utility to the user. By connecting to a larger mainframe computer, the microcomputer user can access databases, electronic mail services, and other sophisticated resources normally beyond the capabilities of the home computer's hardware and software. *CC-Talk* is a terminal software package that can open the door to contemporary telecommunications for users of the Radio Shack TRS-80 Color Computer and the Tandy TDP-100 home computer systems.

The *CC-Talk* package contains all of the functions and features that are necessary to begin exploring telecomputing. Over normal phone lines with a modem, the user can access mainframe computers, bulletin board systems, and information services as a "dumb" terminal. The program can transmit and receive all ASCII characters and control codes in either full or half duplex operation. In addition, *CC-Talk* also provides the capability to download information from the host computer (which can be viewed off-line or saved to tape or disk), and to upload previously prepared ASCII files to the computer on the other end of the line.

The package is comprised of a BASIC language terminal driver program that can be easily modified to suit your own applications and system configuration, and a machine language interface routine that handles the serial input/output functions and hardware interfaces. In the spirit of making telecommunications free and accessible to all, the package is yours to use, enjoy and modify for your personal use.

Using The *CC-Talk* Package

The BASIC language terminal program is shown in Listing 1. It is written in Microsoft's Extended Color BASIC and will operate on any 16K or larger machine. Without modification, the program provides for dumb terminal operation in talk mode; storing of received text to a memory buffer for online or offline viewing in download mode; transmit any ASCII file (text, data, or BASIC program) saved on tape or disk to the host computer in upload mode; and display all previously downloaded text in the memory buffer in save mode. The operating mode is selected by a single-character keypress from the prompted menu of choices displayed at the bottom of the screen.

The first step in installing the terminal package is to type in the BASIC program in Listing 1 and save it to tape or disk as *"CCT.BAS"*. The program, as shown, operates on a 32K system. For users with 16K machines, change all references to hexadecimal address *"&H7xxx"* to *"&H3xxx"*. The same simple modification is required for the BASIC program which loads the machine language I/O routines (coded in *DATA* statements and *POKEd* into memory) shown in Listing 2. Simply change the *START* address from *"&H7D00"* to *"&H3D00"*. After typing in the loading program from Listing 2 and checking your typing carefully, save the program (on a different tape) as *"CCTLOAD"*. It will not be used regularly once it is properly installed.

Next, *RUN* the *"CCTLOAD"* program and, after proper execution, save the machine code to tape or disk using BASIC's *CSAVEM* or *SAVEM* functions under the name of *"CCT.IO"*. This file should immediately follow the BASIC terminal program if you are using a tape system.

To start terminal operations, first make as much memory as possible available to the package and protect the

100 72
270 3
END 139

Listing 1:

```
1 ' CC-TALK (C)1983 FRANK GOSSET
TE
2 ' C/0 DEPARTMENT OF GEOGRAPHY
3 ' UNIVERSITY OF DELAWARE
4 ' NEWARK, DE 19711
5 '
6 ' enter> PCLEAR 1:CLEAR 500,&H
1FFF
7 ' before RUNning the program
8 '
10 START=&H7D00 'memory address
of machine code i/o routines
20 TBUFF=&H2000 'memory address
of download buffer start
30 IF PEEK(ST)=134 THEN 40 ELSE
CLOADM "CCT.IO":REM load i/o rou
tines if not resident
40 DEFUSR1=ST ' talk-mode entry
point
50 DEFUSR2=ST+&H158' download-mo
de entry point
60 DEFUSR3=ST+&H19B' upload-mode
 entry point
70 TECHO=ST+&HD7' full/half dupl
ex switch address
80 TFLG=1' 0=full duplex(default
)/ 1=half duplex
90 POKE TE,TF' set duplex switch
100 CLS:PRINT@200,"C C  - T A L
K":PRINT:PRINTTAB(11)"(C) 1983":
PRINTTAB(9)"DELAGRAPHICS":PRINT
110 GOTO 250' jump to main menu
120 CLS:PRINT@482," talk mode :"
;TM$;:GOSUB 270:TX=USR1(0):RETUR
N
130 CLS:PRINT@482,"downloading";
TM$;:GOSUB 270:TX=USR2(TB):RETUR
N' pass download buffer address
140 CLS:PRINTTAB(8)"BUFFER CONTE
150 ' user may modify to save bu
ffer contents
160 ' to tape or disk file
170 BB=TB:BE=&H7CFF' buffer star
NTS":PRINTTAB(6)"spaceMORE/enter
EXIT":PRINT
t and end addresses
180 FOR I=BB TO BB+255
190 TC=PEEK(I):PRINT CHR$(TC);:N
EXT I
200 S1=PEEK(&H88):S2=PEEK(&H89):
PRINT"cont";:POKE &H88,S1:POKE &
H89,S2
210 GOSUB 260:IF TK$<>CHR$(32)TH
EN 230
220 BB=BB+256:IF BB<BE THEN 180
230 ' end view buffer routine -
modify for file save
240 RETURN
250 TP$=" tALK dOWNLD uPLOAD sAV
E qUIT ":TC$="TDUSQtdusq":TM$="
<break> TO EXIT":GOTO 280
260 TK$=INKEY$:IF TK$="" THEN 26
0 ELSE RETURN
270 POKE &H88,4:POKE &H89,0:RETU
RN'reset screen position
280 PRINT@480, TP$;:GOSUB 260:TC
=INSTR(TC$,TK$):IF TC=0 THEN 280
 ELSE ON TC GOSUB 120,130,320,14
0,285,120,130,320,140,285:GOTO 2
80
285 PRINT:PRINT"   type CONT to
restart":STOP:RETURN
290 'user modifiable upload rout
ine here
300 'i/o routine requires BASIC
VARPTR
310 'of string to be sent to hos
t computer
320 CLS:PRINT@481,"filename>";:I
NPUT TF$:TDEV=-1:OPEN "I",TDEV,T
F$
330 PRINT@481," uploading ";TF$;
:GOSUB 270
340 IF EOF(TDEV) THEN 370 ELSE L
INE INPUT#TDEV,UP$
350 IF TFLG=1 THEN PRINT UP$ 'lo
cal echo for half duplex
360 TX=USR3(VARPTR(UP$)):GOSUB 3
80:GOTO 340
370 CLOSE TDEV:RETURN 'end uploa
d
380 FOR TC=0 TO 255:NEXT TC:RETU
RN 'line turn-around delay
390 'end of listing
```

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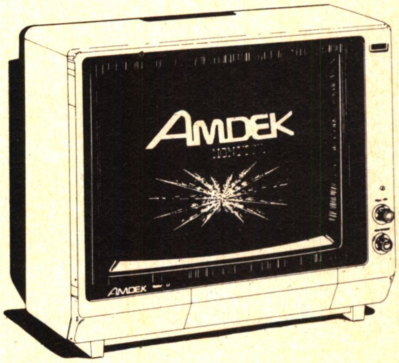

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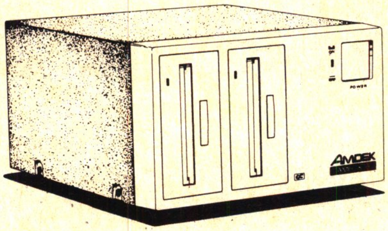

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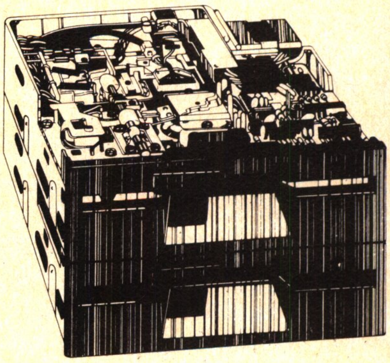

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machine-code in high memory by entering:

PCLEAR 1:CLEAR 500,&H1FFF

Now, *RUN* the *"CCT.BAS"* program. The I/O drivers will be automatically loaded into memory if not already resident, and the menu of choices displayed.

If you are communicating with a remote computer over telephone lines, dial the computer's number and wait for the carrier signal. Enter talk mode by typing a 'T' from the menu. Then, type in whatever is required by the host computer (account number, password, etc.) in order to "sign-on." You are now functioning as a terminal as far as the other computer is concerned. You can exit talk mode by pressing the BREAK key at any point. This will not affect your connection to the host computer, but will return you to the BASIC program's menu. You can return to the talk mode or another mode from the menu as desired. (Note: Text sent from the host while you are at the menu will, however, be lost.)

By typing a 'D' from the menu, you will enter the download mode. In this operating mode, all text sent by the host will be stored in a memory buffer in the Color Computer's memory. A reverse-video asterisk will appear on the screen for each line of text received. The actual text, however, will not appear. If you are downloading a program or data file, it is helpful to know approximately how many lines of text are in the file —as you know, the screen is 32 characters wide and you can count the "dots" to figure out when the downloading is complete. The keyboard functions normally during downloading, so you can send commands to the host to stop the listing just as in talk mode. A message will appear if the memory buffer becomes full, and in this case downloading will cease and you will be returned to the menu. The user can terminate the saving of received text by pressing the BREAK key, which also returns you to the menu.

The save mode (typing 'S' from the menu), as implemented in Listing 1, is actually an "examine buffer contents" routine. Downloaded text is saved in a condensed format, with only valid ASCII characters (both upper- and lowercase) and the CR (Carriage Return) character for each line packed into the buffer. In save mode, the user can step through the stored text, from beginning to end, one page-full at a time. Pressing the space bar continues display of the next portion of the buffer, while hitting the ENTER key aborts the routine and returns to the menu. Since the entire terminal driver is written in BASIC, you can modify this section to actually save the buffer contents to magnetic tape or disk. A simple example of how this might be accomplished will be presented towards the end of this article.

Typing a 'U' from the menu puts you in the upload mode of the package. You

260 44
440 193
560 192
END 73

Listing 2:

```
10 'CC-TALK machine language i/o
20 'BASIC load routine
30 '
40 CLS:CLEAR 1500,&H1FFF
50 ST=&H7D00:CSUM=0
60 PRINT @40,"L O A D I N G"
70 FOR I=0 TO 468:READ X
80 CSUM=CSUM + X
90 POKE ST+I,X
100 NEXT I
110 IF CSUM <>48157 THEN PRINT @
224,"checksum load error--check
data":PRINT:GOTO 130
120 PRINT @228,"I/O DRIVERS INST
ALLED":PRINT:PRINT "enter:":PRIN
T:PRINT"CSAVEM 'CCT.IO',&H7D00,&
H7ED4,&H7D00":PRINT
130 END
200 DATA  134, 0, 167, 141, 0, 3
0, 141, 60, 38, 4
210 DATA  141, 30, 32, 248, 109,
 141, 0, 18, 38, 12
220 DATA  189, 163, 10, 129, 13,
 38, 235, 23, 0, 252
230 DATA  32, 230, 141, 40, 32,
226, 0, 32, 0, 4
240 DATA  32, 42, 189, 161, 193,
 39, 20, 129, 3, 38
250 DATA  13, 166, 141, 255, 237
, 129, 2, 38, 2, 53
260 DATA  2, 53, 16, 57, 23, 0,
149, 57, 23, 0
270 DATA  100, 129, 0, 57, 52, 8
4, 230, 140, 218, 238
280 DATA  140, 213, 174, 140, 20
8, 129, 32, 36, 9, 129
290 DATA  13, 38, 17, 231, 192,
239, 140, 197, 167, 128
300 DATA  175, 140, 190, 140
310 REM   CHANGE THIS NEXT VALUE
 TO 60 FOR 16K
320 DATA  124
330 DATA  255, 16, 39, 1, 19
340 DATA  53, 212, 142, 1, 104,
48, 31, 38, 252, 57
350 DATA  52, 23, 26, 80, 127, 2
55, 32, 141, 239, 52
360 DATA  2, 198, 8, 100, 228, 7
3, 73, 183, 255, 32
370 DATA  141, 226, 90, 38, 244,
 134, 2, 183, 255, 32
380 DATA  141, 216, 141, 214, 50
, 97, 53, 151, 142, 0
390 DATA  192, 32, 3, 142, 1, 11
3, 48, 31, 38, 252
400 DATA  57, 52, 21, 26, 80, 18
2, 255, 34, 71, 37
410 DATA  31, 141, 231, 182, 255
, 34, 71, 37, 242, 79
420 DATA  52, 2, 198, 7, 141, 22
3, 182, 255, 34, 71
```

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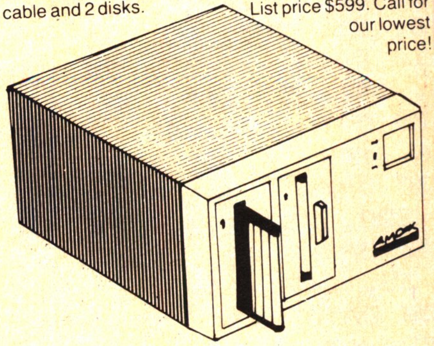

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```
430 DATA  102, 228, 90, 38, 245,
 141, 212, 53, 2, 68
440 DATA  32, 1, 79, 53, 149, 1,
 52, 2, 129, 32
450 DATA  36, 46, 129, 8, 39, 42
, 129, 12, 38, 5
460 DATA  189, 169, 40, 32, 44,
129, 21, 38, 4, 134
470 DATA  127, 32, 33, 129, 10,
38, 15, 189, 161, 193
480 DATA  39, 251, 128, 64, 129,
 31, 38, 18, 141, 63
490 DATA  32, 17, 129, 13, 38, 1
3, 141, 14, 109, 140
500 DATA  200, 39, 3, 189, 163,
10, 23, 255, 97, 53
510 DATA  2, 57, 52, 22, 158, 13
6, 140, 5, 160, 35
520 DATA  30, 48, 136, 192, 52,
16, 142, 4, 0, 236
530 DATA  136, 64, 237, 129, 172
, 228, 35, 247, 204, 96
540 DATA  96, 237, 129, 156, 136
, 35, 247, 53, 16, 159
550 DATA  136, 53, 150, 52, 18,
142, 63, 0, 134, 0
560 DATA  183, 255, 32, 48, 31,
38, 252, 134, 2, 183
570 DATA  255, 32, 53, 146, 189,
 179, 237, 31, 1, 175
580 DATA  141, 254, 196, 142, 4,
 32, 175, 141, 254, 191
590 DATA  134, 1, 167, 141, 254,
 182, 22, 254, 149, 42
600 DATA  42, 66, 85, 70, 70, 69
, 82, 32, 70, 85
610 DATA  76, 76, 42, 42, 13, 48
, 140, 237, 166, 128
620 DATA  189, 163, 10, 129, 13,
 38, 247, 53, 116, 57
630 DATA  23, 255, 24, 129, 0, 3
9, 3, 189, 163, 10
640 DATA  57, 189, 179, 237, 31,
 1, 166, 132, 52, 2
650 DATA  238, 2, 134, 2, 167, 1
41, 254, 120, 141, 226
660 DATA  38, 252, 23, 254, 119,
 141, 219, 166, 192, 23
670 DATA  254, 190, 141, 14, 106
, 228, 38, 236, 134, 13
680 DATA  23, 254, 179, 141, 201
, 53, 2, 57, 109, 141
690 DATA  255, 9, 38, 4, 141, 19
0, 39, 252, 57
```

will be prompted for the name of the ASCII file to be transferred. This file could be text, data or a BASIC program saved in ASCII format. The file is then read (from tape or disk) one line at a time and sent to the host as a character string. This routine can also be altered by the user. The only real requirement is that the BASIC program pass Extended Color BASIC's *VARPTR* (variable pointer) of the string variable to be uploaded to the machine language interface routine.

Uploading text files to the host computer, however, is more complicated than the other functions of the package. While downloading can be accomplished with relatively little knowledge of the computer's operating system on the other end of the connection (other than knowing how to print or list the file to the terminal), uploading requires some familiarity with the operating system of the host computer to get it to accept, save, and catalog your uploaded file. You may have to invoke an editor on the host to create a file to accept the incoming text and to save it properly. Such "housekeeping" chores should be done in talk mode, both before transfer and after the transfer is complete.

> *"CC-Talk is a terminal software package that can open the door to contemporary telecommunications for users of the Radio Shack TRS-80 Color Computer and the Tandy TDP-100 home computer systems."*

During upload mode, the keyboard is essentially de-activated. Hitting the BREAK key (perhaps several times) will abort the upload sequence, and might also crash the BASIC program. Simply *RUN* the program again to recover (as Color BASIC does not have an *ON ERROR* function). Text already transferred to the host computer will remain intact and can be saved or deleted from talk mode.

Entering a 'Q' (for Quit) from the menu returns you to Color BASIC's command level, with the OK prompt. While in Color BASIC, you can list the program, a disk directory, or even modify the program without affecting your modem connection (but all incoming text is lost, of course). You may return to terminal operation at any time by entering *CONT* (Color BASIC's "continue" function) or *RUN* (to restart the program).

While operating in any of the terminal modes, several of the keys are redefined to perform the special functions required of data terminals. Both upper- and lowercase letters can be sent to the host computer, with lowercase letters displayed in reverse video on the screen. The program defaults to an ALL CAPS mode which can be switched to upper/lower mode by SHIFT [0], just as in Color BASIC. The down arrow key is redefined as the *CNTRL* (control) key. Special control codes required by many mainframe computers, such as "*CNTRL C*," can be sent to the host by pressing the down arrow key and then the appropriate letter. (Note: This must be capital letter if in upper-/lowercase mode.) The SHIFT-left arrow (backspace) combination sends the ASCII *DEL* (delete) character, which erases the current line on many mainframes. A BREAK signal or *NULL* can be sent by pressing the down arrow then the SHIFT-up arrow

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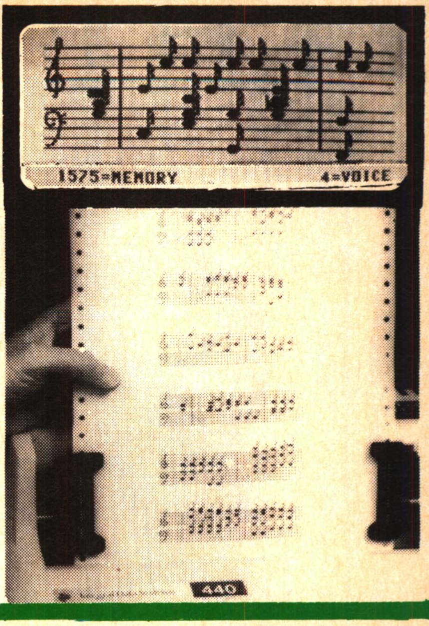

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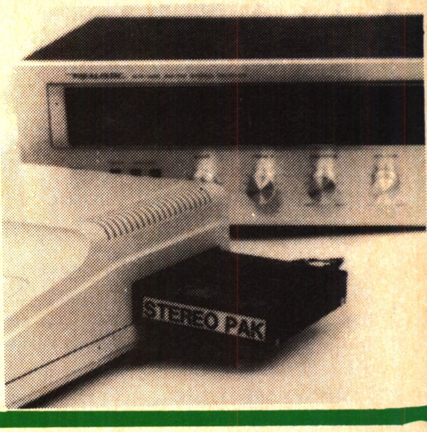

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- Only the VOICE has dual outputs. Listen through your TV speaker or connect to your stereo system.
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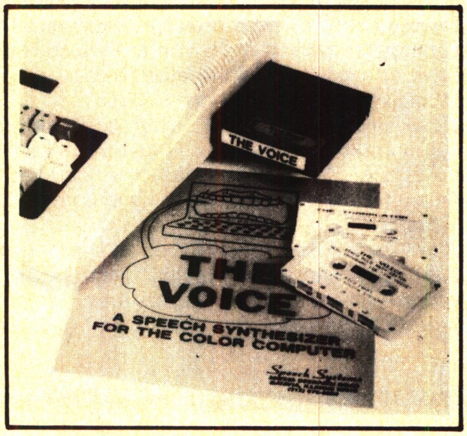

FREE TRANSLATOR

A special ML "translation program" is included free which automatically converts English to speech. This program is incredible. It not only speaks anything you request, but even numbers such as $12,234.55 are spoken in dollars and cents. In addition, an "exception table" option actually allows you to specify a particular pronunciation if you like.

Writing your own BASIC programs to use speech is a "piece of cake". Just change your PRINT statements to USR.

A very special feature allows all text that is sent to the screen to be spoken. Thus a blind person can actually write programs. You'll be amazed!

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If you're not 100% satisfied after 30 days, simply return the VOICE for a complete refund.

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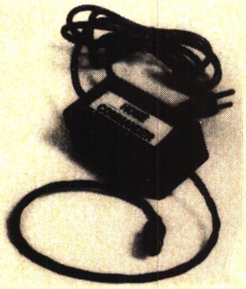

CONTROL YOUR WORLD

Give yourself piece of mind while on vacation by programming the HOME COMMANDER to control lamps, radios, TVs and more. Or make life easy on yourself by turning on the coffee pot before you wake up. You can do this and more with the HOME COMMANDER.

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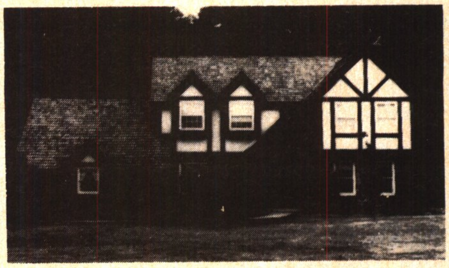
The HOME COMMANDER uses your homes existing electrical wiring to control virtually anything. Appliances are controlled via small control modules (sold separately). The LAMP DIMMER MODULE allows you to turn a lamp on or off and control 16 brightness levels. The APPLIANCE MODULE is used to control appliances up to 400 watts such as a TV, radio, stereo system, fan or motor.



ON FRIDAY 7:42 PM, OFF SUNDAY 1:26 AM

Included FREE is a program to allow you to control up to 256 devices and specify the time and date they are to be activated. That's right, the software has its own built in accurate clock.

LAMP DIMMER MODULE **$16.95** APPLIANCE MODULE **$16.95**

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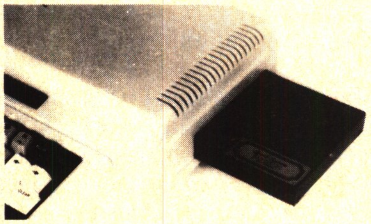

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Use the PRECISION TIME MODULE to add the time element to your game. Or use on your BBS so that the time will always be perfectly accurate.

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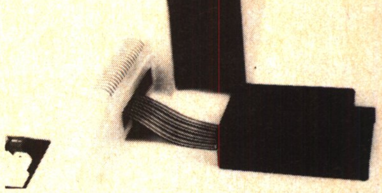
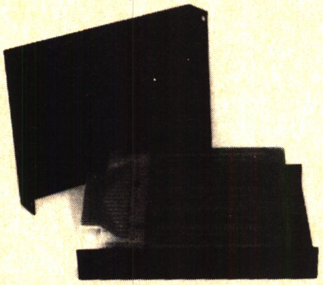


NEW!

ATTENTION EXPERIMENTERS!



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combination. A summary of the redefined key functions is found in Figure 1.

The major advantage of writing the main terminal program in BASIC is to provide the user with a telecommunications environment that can be modified to suit his or her particular needs. As you use and modify the program to your own applications you will, no doubt, discover trade-offs and limitations that result from this decision. However, compared to many communications packages available for home computers, you may find the flexibility inherent in my approach more than makes up for its shortcomings. One can, in fact, through a careful examination of the program in Listing 1, incorporate specific terminal functions into your other programs. The possibilities for innovation are limited only by your imagination.

Figure 1:

SPECIAL FUNCTION KEYS

KEY PRESSED	FUNCTION	CHARACTER SENT
<BREAK>	BREAK	NONE
<CLEAR>	CLEARS SCREEN	NONE
Left ARROW	BACKSPACE	BACKSPACE
<SHIFT> L. ARROW	ERASE LINE	DELETE
<SHIFT>ZERO	UPPER/lower case	NONE
Down ARROW	<CNTRL>	CONTROL CHARACTER See Note Below
<CNTRL> + <SHIFT>	LONG BREAK	NULL
UP ARROW		NONE

NOTE: The DOWN ARROW <CNTRL> Key Causes Terminal to Pause and wait for next key pressed. The "control code" for that character is then sent to the host.

Most Host Computers support the use of special "control characters" such as "CNTRL-C." When the keyboard is in lower case mode, the proper control code can be sent by <CNTRL> then <SHIFT> character.

Technical Considerations

The actual asynchronous communications parameters used by *CC-Talk* are:

Transmission Rate	**300 Baud**
Word Size	8 bits (seven data, space parity)
Stop Bits	Two
Start Bits	One
Parity	No checking (space parity sent)

These specifications should be compatible with nearly all timesharing systems you may wish to contact, including business or university mainframes, and microcomputer-based bulletin boards.

Terminal operations can be performed in either full or half duplex modes. In full duplex mode, all characters sent to the host computer are "echoed" by the host and then displayed on the Color Computer's screen. Half duplex or "local echo" mode, used by some systems, does not send back the character received. In this operating mode, characters are displayed on the screen before being sent out. The "duplex switch" is controlled by the variable *TFLAG* in Line 80 of program Listing 1. If the host computer you are connected to does not echo the characters as received (nothing appears on the screen as you type), change the value of *TFLAG* to one for half-duplex operation.

The Machine Language I/O Routines

Technically, the Tandy Color Computers include, as standard equipment, an RS-232 serial communications interface. In reality, the "serial port" must be directly controlled by the MC6809E central processor (CPU) in software. The only use for the serial interface supported in Microsoft BASIC (in Read Only Memory) is a serial printer, such as Radio Shack's DMP-100. Input from or output to any other peripheral device, such as the modem, must be program-

Listing 3:

```
                  00010 *
                  00020 *       (C)1983
                  00030 *    FRANK GOSSETTE
                  00040 * DEPARTMENT OF GEOGRAPHY
                  00050 * UNIVERSITY OF DELAWARE
                  00060 *
7D00              00100        ORG    $7D00
                  00110 *
                  00120 *  CC-TALK TERMINAL
                  00130 *    I/O ROUTINES
                  00140 *
         A1C1     00150 POLKEY  EQU    $0A1C1
         A30A     00160 SCNOUT  EQU    $0A30A
         A928     00170 CLRSCN  EQU    $0A928
         B3ED     00180 INTCNV  EQU    $B3ED
         0088     00190 CURPOS  EQU    $88
         3CFF     00200 MAXBUF  EQU    $3CFF
                  00210 *
                  00220 *
                  00230 * MAIN TERMINAL LOOP
                          00240 *
7D00 86    00             00250 START   LDA    #$00
7D02 A7    8D 001E        00260         STA    MODE,PCR
7D06 8D    3C             00270 TERM    BSR    INCHEK
7D08 26    04             00280         BNE    TMODE
7D0A 8D    1E             00290         BSR    KEYCHK
7D0C 20    F8             00300         BRA    TERM
7D0E 6D    8D 0012        00310 TMODE   TST    MODE,PCR
7D12 26    0C             00320         BNE    OTHER
7D14 BD    A30A           00330         JSR    SCNOUT
7D17 81    0D             00340         CMPA   #$0D
7D19 26    EB             00350         BNE    TERM
7D1B 17    00FC           00360         LBSR   SCROLL
7D1E 20    E6             00370         BRA    TERM
7D20 8D    28             00380 OTHER   BSR    ALTMOD
7D22 20    E2             00390         BRA    TERM
                          00400 *
7D24                      00410 MODE    RMB    1
7D25                      00420 BUFPOS  RMB    2
7D27                      00430 SCNPOS  RMB    2
```

```
7D29      2A        00440 LINCHR  FCB     $2A
                    00450 *
7D2A BD   A1C1      00460 KEYCHK  JSR     POLKEY
7D2D 27   14        00470         BEQ     XKEY
7D2F 81   03        00480         CMPA    #$03
7D31 26   0D        00490         BNE     DECODE
7D33 A6   8D FFED   00500         LDA     MODE,PCR
7D37 81   02        00510         CMPA    #$02
7D39 26   02        00520         BNE     RET1
7D3B 35   02        00530         PULS    A
7D3D 35   10        00540 RET1    PULS    X
7D3F 39             00550         RTS
7D40 17   0095      00560 DECODE  LBSR    KEYCOD
7D43 39             00570 XKEY    RTS
                    00580 *
7D44 17   0064      00590 INCHEK  LBSR    INPUT
7D47 81   00        00600         CMPA    #$00
7D49 39             00610         RTS
                    00620 *
7D4A 34   54        00630 ALTMOD  PSHS    U,X,B
7D4C E6   8C DA     00640         LDB     LINCHR,PCR
7D4F EE   8C D5     00650         LDU     SCNPOS,PCR
7D52 AE   8C D0     00660         LDX     BUFPOS,PCR
7D55 81   20        00670         CMPA    #$20
7D57 24   09        00680         BHS     SAVE
7D59 81   0D        00690         CMPA    #$0D
7D5B 26   11        00700         BNE     XALT
7D5D E7   C0        00710         STB     ,U+
7D5F EF   8C C5     00720         STU     SCNPOS,PCR
7D62 A7   80        00730 SAVE    STA     ,X+
7D64 AF   8C BE     00740         STX     BUFPOS,PCR
7D67 8C   3CFF      00750         CMPX    #MAXBUF
7D6A 1027 0113      00760         LBEQ    MSG
7D6E 35   D4        00770 XALT    PULS    PC,U,X,B
                    00780 *
                    00790 *  RS232 OUTPUT
                    00800 *
7D70 8E   0168      00810 WTOUT   LDX     #$0168
7D73 30   1F        00820 OUT1    LEAX    -1,X
7D75 26   FC        00830         BNE     OUT1
7D77 39             00840         RTS
7D78 34   17        00850 OUTCHR  PSHS    X,B,A,CC
7D7A 1A   50        00860         ORCC    #$50
7D7C 7F   FF20      00870         CLR     $0FF20
7D7F 8D   EF        00880         BSR     WTOUT
7D81 34   02        00890         PSHS    A
7D83 C6   08        00900         LDB     #$08
7D85 64   E4        00910 OUT2    LSR     ,S
7D87 49             00920         ROLA
7D88 49             00930         ROLA
7D89 B7   FF20      00940         STA     $0FF20
7D8C 8D   E2        00950         BSR     WTOUT
7D8E 5A             00960         DECB
7D8F 26   F4        00970         BNE     OUT2
7D91 86   02        00980         LDA     #$02
7D93 B7   FF20      00990         STA     $0FF20
```

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```
7D96 8D    D8      01000         BSR    WTOUT
7D98 8D    D6      01010         BSR    WTOUT
7D9A 32    61      01020         LEAS   1,S
7D9C 35    97      01030 XOUT    PULS   PC,X,B,A,CC
                   01040 *
                   01050 * RS232 INPUT
                   01060 *
7D9E 8E    00C0    01070 HALF    LDX    #$00C0
7DA1 20    03      01080         BRA    INWAIT
7DA3 8E    0171    01090 FULL    LDX    #$0171
7DA6 30    1F      01100 INWAIT  LEAX   -1,X
7DA8 26    FC      01110         BNE    INWAIT
7DAA 39            01120         RTS
                   01130 *
7DAB 34    15      01140 INPUT   PSHS   X,B,CC
7DAD 1A    50      01150         ORCC   #$50
7DAF B6    FF22    01160 IN1     LDA    $0FF22
7DB2 47            01170         ASRA
7DB3 25    1F      01180         BLO    XINP
7DB5 8D    E7      01190         BSR    HALF
7DB7 B6    FF22    01200         LDA    $0FF22
7DBA 47            01210         ASRA
7DBB 25    F2      01220         BLO    IN1
7DBD 4F            01230         CLRA
7DBE 34    02      01240         PSHS   A
7DC0 C6    07      01250         LDB    #$07
7DC2 8D    DF      01260 IN2     BSR    FULL
7DC4 B6    FF22    01270         LDA    $0FF22
7DC7 47            01280         ASRA
7DC8 66    E4      01290         ROR    ,S
7DCA 5A            01300         DECB
7DCB 26    F5      01310         BNE    IN2
7DCD 8D    D4      01320         BSR    FULL
7DCF 35    02      01330         PULS   A
7DD1 44            01340         LSRA
7DD2 20    01      01350         BRA    INEND
7DD4 4F            01360 XINP    CLRA
7DD5 35    95      01370 INEND   PULS   PC,X,B,CC
                   01380 *
                   01390 * KEYBOARD DECODER
                   01400 *
7DD7       01      01410 ECHO    FCB    $01
7DD8 34    02      01420 KEYCOD  PSHS   A
7DDA 81    20      01430         CMPA   #$20
7DDC 24    2E      01440         BHS    TECHO
7DDE 81    08      01450         CMPA   #$08
7DE0 27    2A      01460         BEQ    TECHO
7DE2 81    0C      01470         CMPA   #$0C
7DE4 26    05      01480         BNE    DEL
7DE6 BD    A928    01490         JSR    >CLRSCN
7DE9 20    2C      01500         BRA    XKEYCD
7DEB 81    15      01510 DEL     CMPA   #$15
7DED 26    04      01520         BNE    CNTRL
7DEF 86    7F      01530         LDA    #$7F
7DF1 20    21      01540         BRA    SNDKEY
7DF3 81    0A      01550 CNTRL   CMPA   #$0A
```

```
7DF5 26    0F        01560          BNE    ENTER
7DF7 BD    A1C1      01570 K2       JSR    POLKEY
7DFA 27    FB        01580          BEQ    K2
7DFC 80    40        01590          SUBA   #$40
7DFE 81    1F        01600          CMPA   #$1F
7E00 26    12        01610          BNE    SNDKEY
7E02 8D    3F        01620          BSR    NULL
7E04 20    11        01630          BRA    XKEYCD
7E06 81    0D        01640 ENTER    CMPA   #$0D
7E08 26    0D        01650          BNE    XKEYCD
7E0A 8D    0E        01660          BSR    SCROLL
7E0C 6D    8C C8     01670 TECHO    TST    ECHO,PCR
7E0F 27    03        01680          BEQ    SNDKEY
7E11 BD    A30A      01690          JSR    SCNOUT
7E14 17    FF61      01700 SNDKEY   LBSR   OUTCHR
7E17 35    02        01710 XKEYCD   PULS   A
7E19 39              01720          RTS
                     01730 *
                     01740 *  SCREEN SCROLL
                     01750 *
7E1A 34    16        01760 SCROLL   PSHS   X,B,A
7E1C 9E    88        01770          LDX    <CURPOS
7E1E 8C    05A0      01780          CMPX   #$05A0
7E21 23    1E        01790          BLS    XSCRL
7E23 30    88 C0     01800          LEAX   -$40,X
7E26 34    10        01810          PSHS   X
7E28 8E    0400      01820          LDX    #$0400
7E2B EC    88 40     01830 MOVE     LDD    $40,X
7E2E ED    81        01840          STD    ,X++
7E30 AC    E4        01850          CMPX   ,S
7E32 23    F7        01860          BLS    MOVE
7E34 CC    6060      01870 BLANK    LDD    #$6060
7E37 ED    81        01880          STD    ,X++
7E39 9C    88        01890          CMPX   <CURPOS
7E3B 23    F7        01900          BLS    BLANK
7E3D 35    10        01910          PULS   X
7E3F 9F    88        01920          STX    <CURPOS
7E41 35    96        01930 XSCRL    PULS   PC,X,B,A
                     01940 *
                     01950 * LONG NULL BREAK
                     01960 *
7E43 34    12        01970 NULL     PSHS   X,A
7E45 8E    3F00      01980          LDX    #$3F00
7E48 86    00        01990          LDA    #00
7E4A B7    FF20      02000          STA    $0FF20
7E4D 30    1F        02010 NWAIT    LEAX   -1,X
7E4F 26    FC        02020          BNE    NWAIT
7E51 86    02        02030          LDA    #02
7E53 B7    FF20      02040          STA    $0FF20
7E56 35    92        02050 XNULL    PULS   PC,X,A
                     02060 *
                     02070 *  INIT DOWNLOAD
                     02080 *
7E58 BD    B3ED      02090 DINIT    JSR    INTCNV
7E5B 1F    01        02100          TFR    D,X
7E5D AF    8D FEC4   02110          STX    BUFPOS,PCR
7E61 8E    0420      02120          LDX    #$0420
7E64 AF    8D FEBF   02130          STX    SCNPOS,PCR
```

```
7E68 86    01        02140          LDA    #$01
7E6A A7    8D FEB6   02150          STA    MODE,PCR
7E6E 16    FE95      02160          LBRA   TERM
                     02170 *
                     02180 * BUFFER FULL MSG
                     02190 *
7E71       2A        02200 MCHAR    FCC    /**BUFFER FULL
7E80       0D        02210 CR       FCB    $0D
                     02220 *
7E81 30    8C ED     02230 MSG      LEAX   MCHAR,PCR
7E84 A6    80        02240 SHOW     LDA    ,X+
7E86 BD    A30A      02250          JSR    SCNOUT
7E89 81    0D        02260          CMPA   #$0D
7E8B 26    F7        02270          BNE    SHOW
7E8D 35    74        02280 ABORT    PULS   U,Y,X,B
7E8F 39              02290          RTS
                     02300 *
                     02310 *  UPLOAD ROUTINE
                     02320 *
7E90 17    FF18      02330 TSTIN    LBSR   INPUT
7E93 81    00        02340          CMPA   #00
7E95 27    03        02350          BEQ    XTSTI
7E97 BD    A30A      02360          JSR    SCNOUT
7E9A 39              02370 XTSTI    RTS
                     02380 *
7E9B BD    B3ED      02390 UPLOAD   JSR    INTCNV
7E9E 1F    01        02400          TFR    D,X
7EA0 A6    84        02410          LDA    ,X
7EA2 34    02        02420          PSHS   A
7EA4 EE    02        02430          LDU    2,X
7EA6 86    02        02440          LDA    #$02
7EA8 A7    8D FE78   02450          STA    MODE,PCR
7EAC 8D    E2        02460 CHEKIN   BSR    TSTIN
7EAE 26    FC        02470          BNE    CHEKIN
7EB0 17    FE77      02480          LBSR   KEYCHK
7EB3 8D    DB        02490          BSR    TSTIN
7EB5 A6    C0        02500          LDA    ,U+
7EB7 17    FEBE      02510          LBSR   OUTCHR
7EBA 8D    0E        02520          BSR    TSTECH
7EBC 6A    E4        02530          DEC    ,S
7EBE 26    EC        02540          BNE    CHEKIN
7EC0 86    0D        02550 UPDONE   LDA    #$0D
7EC2 17    FEB3      02560          LBSR   OUTCHR
7EC5 8D    C9        02570          BSR    TSTIN
7EC7 35    02        02580          PULS   A
7EC9 39              02590          RTS
                     02600 *
                     02610 * TEST FOR FULL DUPLEX
7ECA 6D    8D FF09   02620 TSTECH   TST    ECHO,PCR
7ECE 26    04        02630          BNE    XTEC
7ED0 8D    BE        02640 WECHO    BSR    TSTIN
7ED2 27    FC        02650          BEQ    WECHO
7ED4 39              02660 XTEC     RTS
                     02670 *
                     02680 *
                     02690 *
           0000      02700          END

00000 TOTAL ERRORS
```

med by the user. Listing 3 provides the assembly language source code for the input/output interfaces and other high-speed terminal functions needed for telecommunications operations. (These operations can only be done in machine language, as BASIC is much too slow.)

The machine code is quite compact, occupying only 468 bytes of memory, and is completely relocatable (meaning it can be placed anywhere in Random Access Memory and it will function properly). The I/O routines employ some of the built-in functions from Color BASIC's Read Only Memory for polling the keyboard, clearing the screen, and displaying a character on the screen — thereby reducing the memory requirements of the routines. The assembly language program in Listing 3 was produced on Radio Shack's *EDTASM+* editor/assembler.

The assembly language routines which perform the actual serial input and output functions are subroutines *OUTCHR* (Listing 3, Lines 810 through 1030) and *INPUT* (Lines 1070 through 1370). *OUTCHR* sends the character in the 6809 CPU accumulator "A" to the serial output port (bit one of address $FF20) as an eight-bit word with one start bit, seven data bits, space parity, and two stop bits. Subroutine *INPUT* checks the RS-232 input line (bit zero of $FF22) for a start bit and, if found, returns a seven-bit ASCII character in accumulator "A" without checking parity.

While in one of the terminal modes, the I/O interface re-configures the functions of several of the keys, as described above, in subroutine *KEYCOD* (Lines 1420 through 1720). Whenever the down arrow key is pressed (redefined as the *CNTRL* key), the terminal waits on the next key pressed as the control character to be sent. The routine also checks the contents of *ECHO* (Line 1410) to determine if you are operating in full or half-duplex mode — set by the variable *TFLAG* in the BASIC program. If you are operating in half duplex mode, input from the keyboard will be displayed on the screen before transmission.

> ***"The major advantage of writing the main terminal program in BASIC is to provide the user with a telecommunications environment that can be modified to suit his or her particular needs."***

Since the Color Computer's screen displays only 16 lines of 32 characters each, lines to text sent by the host computer (typically 80 columns in length) can quickly fill the screen. Most mainframe computers provide a "line-turnaround" delay at the end of each line to allow a hard-copy terminal time to reposition the print head back at the left of the page. The I/O interface takes advantage of this delay by scrolling the screen during this pause, if the screen is nearly full. This procedure (Lines 1760-1950 of Listing 3) opens at least two lines (64 characters) at the bottom of the screen for the next incoming line, and eliminates most instances of data loss due to having the screen scroll in the middle of a line being received.

The main terminal loop (Lines 270-390) controls the operations of talk mode and downloading. The routine continuously scans the input port for a character received, and either displays the text on the screen or stores the incoming text in the memory buffer depending on the value of *MODE* (Line 410). When in download mode, subroutine *ALTMOD* does the input buffering and displays the line-received character (asterisk) for each line stored. When the buffer is full, a message is displayed and program control is returned to the BASIC menu.

Downloading is initialized in the routine *DINIT* (Lines 2090 to 1120). This procedure takes the argument *TBUFF* (Line 60 in Listing 1) from the *USR2* call in the BASIC program as the starting point in memory for the downloaded text. Incoming data will be stored sequentially from this address up to *MAXBUF* (Listing 3, Line 200) — $7CFF for a 32K system.

The uploading routine, Lines 2390 through 2590 of Listing 3, begins by retrieving the *VARPTR* argument of the string variable to be sent which was passed by the BASIC program. Extended Color BASIC's variable pointer for string variables defines a memory address which contains the length of the string, and the 16-bit address of the starting character of the string. These values are used by the routine to determine how many characters are to be sent and where to find them in memory. After sending the string, one character at a time, the routine appends a CR (Carriage Return) to the output stream and returns to the BASIC calling program. If you are operating in full duplex, the routine waits for the host's echo before sending the next character.

Enhancements And Other Features

Whether you are a beginning BASIC programmer or an accomplished hacker, there are numerous modifications and enhancements that can be made to the

Listing 4:

```
140 CLS:PRINTTAB(8)"BUFFER CONTE
NTS":PRINTTAB(6)"spaceMORE/enter
EXIT"
150 INPUT "SAVE FILE NAME";TF$:I
F TF$<>"" THEN TSAVE=1:OPEN "O",
#-1,TF$
160 ' <enter> ( null filename) t
o preview buffer contents only
170 BB=TB:BE=&H7CFF' buffer star
t and end addresses
180 J=0:SV$="":FOR I=BB TO BB+25
0
190 TC=PEEK(I):J=J+1:IF TC=13 TH
EN 195 ELSE SV$=SV$+CHR$(TC):NEX
T I
195 PRINT "no <cr> found" '250 c
haracters without end-of-line
200 PRINT SV$ 'display line on s
creen
210 GOSUB 260:IF TK$<>CHR$(32) T
HEN 230
215 IF TSAVE THN PRINT #-1,SV$ '
PRINT TO TAPE
220 BB=BB+J:IF BB<BE THEN 180
230 CLOSE #-1
240 RETURN 'end of save routine
```

package. One of the simplest, and most useful, would be to add the capability of actually saving downloaded text to tape or disk on your own system. Program Listing 4 provides an example of how this might be accomplished for those of you with tape systems. Lines 150 through 240 of the BASIC terminal driver program in Listing 1 are replaced with a new subroutine. First, you are prompted for the name of the new file. If you respond with a valid character string, a new file is opened to receive the text (an ENTER allows you to look, but not save). The program then *PEEKs* into the memory buffer and creates a string variable until the end-of-line carriage return character is encountered. Then, the line of text is written to the tape. This process continues for each line of text displayed on the screen as you press the space bar. Pressing the ENTER key will terminate saving, close the tape file, and return you to the main menu.

Any type of text, including a BASIC program listing, can be saved in this fashion. Since the file is an ASCII character file, a program can be loaded just as if it had been saved using Color BASIC's (*CSAVE"filename",A*) option. A useful further enhancement of this routine would be the option of choosing to save, delete, or edit a downloaded line as it is displayed. I'll leave that idea for you to experiment with on your own.

Whenever you are connected to a mainframe computer — whether it is the computer at work, school, or one of the subscription services catering to microcomputer users — you need to spend some time to familiarize yourself with the peculiarities and functions of the operating system. In some cases, you can take advantage of the more powerful system software on the host to make your terminal session more enjoyable. For example, many operating systems allow you to specify certain attributes of your terminal — screen size, line width, end-of-line character (Carriage Return or Line Feed + Carriage Return) etc. If you can specify line width, set the host to send 32-character lines. This will eliminate the "word-wrap" of the Color Computer's screen which some people find annoying.

CC-Talk uses only the carriage return to terminate a line, and ignores a line feed if sent by the host. If the other computer requires a linefeed as part of the end-of-line signal, see if you can change the "terminal environment" settings on the host, or type *CNTRL J* from the keyboard. When uploading a file to a system that requires a linefeed, you can add a line to the *CCT.BAS* program:

```
255 UP$=UP$ + CHR$(10)
```

This should cure any problems associated with that feature of the program.

When operating in full duplex mode, on some systems, it may be necessary to clear the screen prior to uploading a text string. If you encounter problems, simply modify Line 350 in the BASIC program to read:

```
350 IF TFLG=1 THEN PRINT UP$
ELSE CLS 'print or clear
```

The possibilities for further enhancements to the package are endless — put your ingenuity to good use. I use a highly modified version for turning the Color Computer into a color graphics terminal running mapping and graphics software on the university's mainframes. Perhaps, in a future article, I'll show you how much fun that can be. In the meantime, enjoy this no-cost introduction to telecommunications and share your discoveries and enhancements with others!

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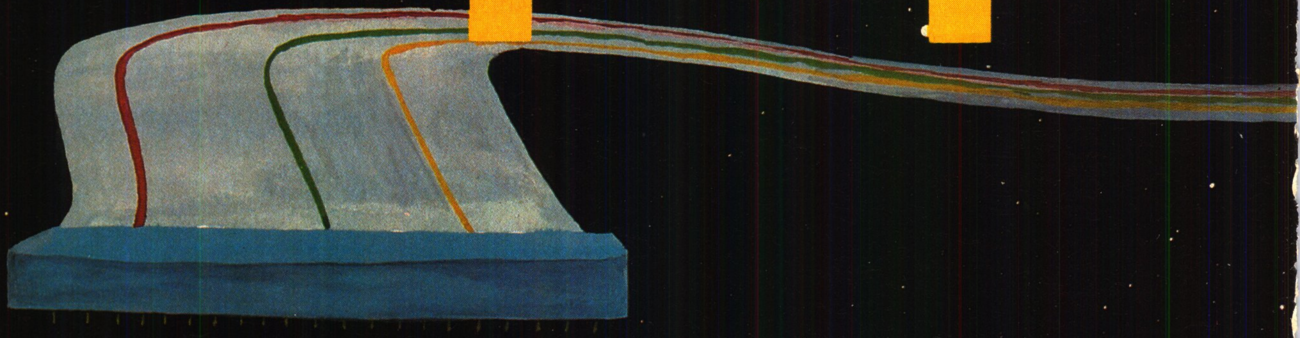
DATA COMMUNICATIONS

A comprehensive listing of bulletin board systems

BBS Wrap-Up



By R. Wayne Day

Here is a verified list of 92 bulletin boards which are of interest to CoCo users. The list contains BBS systems that are dedicated to the CoCo, as well as BBS systems which are covering more specialized interests, such as OS-9 and FLEX.

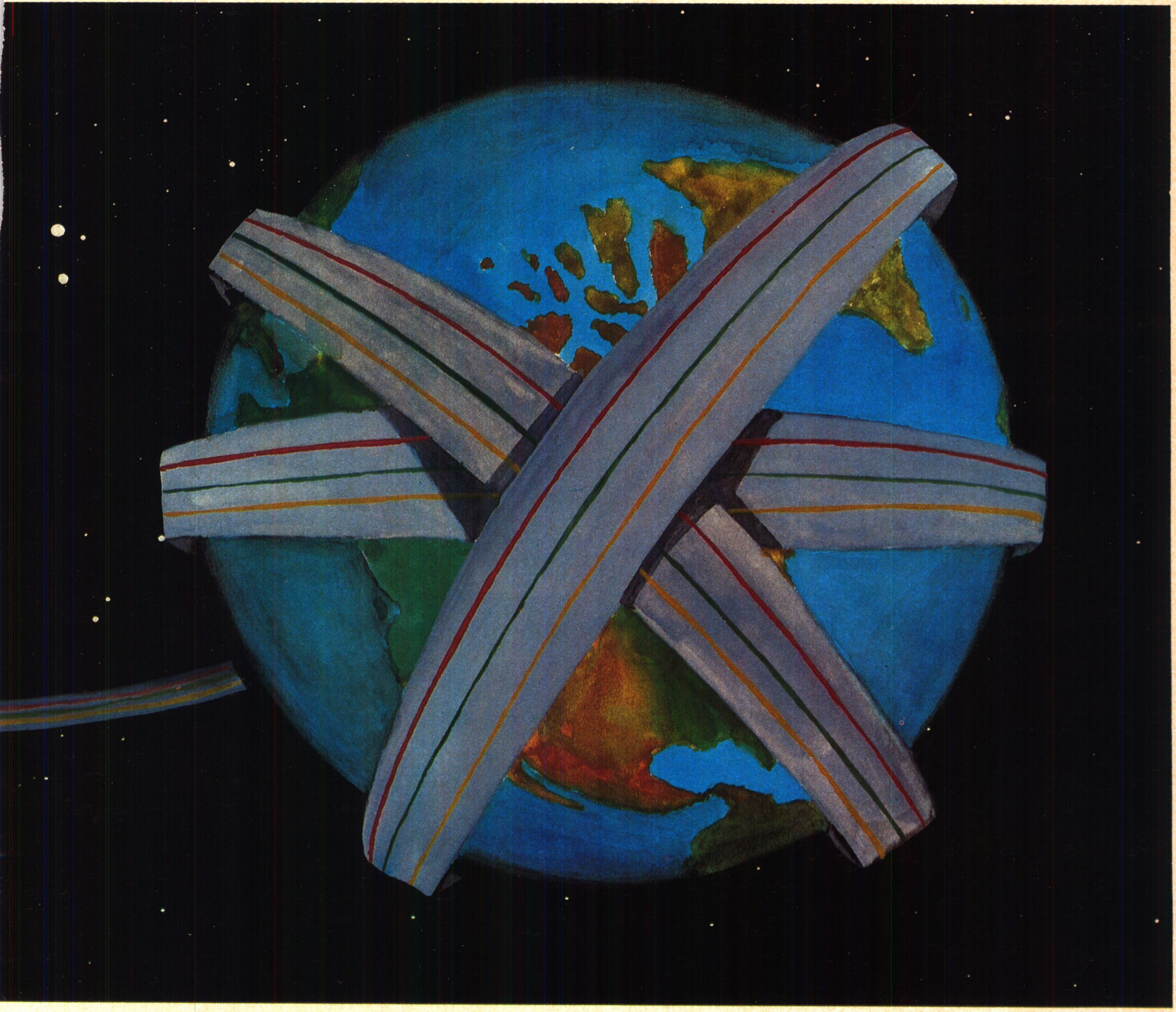
Each of these listings have been verified during the months of July, August and September of this year. To the best of my knowledge, the information contained in the list is accurate and up to date.

(Wayne Day, a traffic engineering signal technician, is the SYSOP of The Color SIG of CompuServe, the world's largest consumer information service. He is also a certified paramedic and works part-time for an Emergency Medical Service provider. His amateur radio operator call sign is WA5WDB.)

The times given in the notes are the local times of the BBS in 24 hour military time (1700 = 5 p.m.).

If you call a particular number, and the phone is not answered by the BBS, it may mean that the board is "down" for maintenance, there is a power failure in the BBS's area, or the system operator may be on vacation.

If, though, over a period of a couple of weeks,



the board still fails to answer, you can assume that it is no longer available for use.

Notoriously, bulletin boards come and go, almost as often as BBS lists do. In fact, more than one person has been known to quip that some BBS systems just wait until their number is published, then pull the plug.

To that end, we at THE RAINBOW would like you to help us keep this BBS list accurate. Please advise us of any changes, corrections, additions or deletions you may find.

Please address your BBS information to:

Wayne Day, Contributing Editor
The Rainbow
9529 U.S. Highway 42
Box 385
Prospect, KY 40059

Or you may electronically notify us of changes by using:

CompuServe EMAIL to 76703,376
or
MCI Mail to Wayne Day (201-7723)

Color Computer/FLEX/OS9 BBS LIST
updated 9/04/84 Verification dates 7-84/9-84

A/C	Number	City	BBS Name	Remarks
(201)	572-0617	New Brunswick, NJ	CoCo Board	
(201)	637-6286	Vienna, NJ	Colorama of NJ	
(201)	725-5028	Manville, NJ	C.C.I.E.	
(201)	827-7815	Ogdenburg, NJ	PeopleLinks	
(206)	255-5150	Renton, WA	The Light House	
(206)	256-2321	Vancouver, WA	Northwest Color Conn	
(209)	223-3800	Jackson, CA	Gold Country	
(212)	441-3755	Woodhaven, NY	Rainbow #1	
(212)	441-3766	Woodhaven, NY	Rainbow #2	
(212)	441-5719	Woodhaven, NY	Rainbow #3	
(212)	441-5907	Woodhaven, NY	Rainbow #4	
(212)	825-0780	Governors Isl., NY	Colorama	Note 2
(213)	244-1100	Burbank, CA	Fantasy Plaza	
(213)	258-0640	Los Angeles, CA	Musashi-Color 80	
(213)	388-5198	Los Angeles, CA	Magnetic Fantasies	
(213)	690-4589	Los Angeles, CA	The Next Step	Note 3
(215)	277-6951	<unknown>	MY BBS (OS9)	Note 4
(216)	788-7910	Youngstown, OH	CoCo Nut Tree	
(217)	753-3167	Springfield, IL	Link up	
(219)	256-5782	Mishawaka, IN	SAGCOM CoCo Line	
(303)	690-9423	Aurora, CO	Controller Board	
(304)	599-0760	Morgantown, WV	Mountaineer	
(305)	274-3394	Miami, FL	RemoteOS9	
(305)	681-6809	Hialeah, FL	CoCo Corner	
(305)	681-8490	Hialeah, FL	CoCo Corner #2	
(305)	751-6809	Miami, FL	Color Info Center	
(308)	665-1526	Crawford, NE	Colorama	Note 9
(312)	286-9015	Chicago, IL	Skylink	
(312)	397-8308	Chicago, IL	OS-9 Users Gp.	Note 1
(312)	597-8485	Chicago, IL	Creme de CoCo	
(312)	720-0796	Chicago, IL	CoCo Extraordinaire	
(312)	879-6811	Batavia, IL	Speech Systems	
(313)	981-5061	Canton, MI	CoCo Club	
(315)	487-0503	Syracuse, NY	Color-80	
(316)	686-3813	Wichita, KS	Color-80	
(401)	272-1138	Providence, RI	Syslink-80	
(403)	474-0147	Edmonton, Alberta	Northern Alberta CoCo	
(404)	378-4410	Atlanta, GA	CoCo Board HQ	HQTRS SYS
(405)	728-7654	Oklahoma City, OK	FLEXNET	
(405)	248-8433	Lawton, OK	Shambala	
(408)	984-7937	San Jose, CA	Rainbow #5	
(409)	983-2383	Port Arthur, TX	CoCo Club BBS	
(412)	744-2335	Pittsburgh, PA	CoConet	
(415)	782-4402	Berkley, CA	East Bay BBS	
(416)	494-7001	Toronto, Ontario	Colour BBS	
(416)	653-2248	Toronto, Ontario	Colour Dragon #1	
(416)	689-7950	Toronto, Ontario	Dave's Datacom	
(501)	735-5614	West Memphis, AR	CoBBS #1	
(503)	649-4497	Aloha, OR	Bee Color BBS	
(503)	761-6345	Portland, OR	Bit Bucket Sys	
(504)	277-9450	New Orleans, LA	N.O. CoCo BBS	
(512)	285-5028	Elgin, TX	Colorama	HQTRS SYS
(513)	474-2985	Cincinnati, OH	CINTUG	
(515)	277-6510	Des Moines, IA	CoCo Club	
(516)	277-1285	Islip, NY	Colorama	
(516)	331-3718	Port Jefferson Sta., NY	Colorama	Note 9
(516)	673-9452	Long Island, NY	<unknown>	
(517)	339-3367	Lansing, MI	CompuNet TBBS # 1	
(517)	793-1579	Saginaw, MI	C/Net	

(604) 585-0680	Delta, British Columbia	Color-80	
(604) 738-2773	Vancouver, British Columbia	Color Pacific	
(615) 842-6809	Hixson, TN	68 Micro Journ.	FLEX
(617) 646-6809	Arlington, MA	Logical Products	
(619) 474-8981	San Diego, CA	JARB / CoCo SIG	Note 9
(701) 281-0233	Riverside, ND	Dakota Database	
(701) 839-0390	Fargo, ND	Country Micro BBS	Note 6
(703) 476-1147	Reston, VA	Samoht BBS	Note 5
(707) 437-6336	Travis AFB, CA	Falcon Color 80	
(713) 331-2599	Houston, TX	Freelancin'	
(713) 488-2003	Houston, TX	Freelancin' #2	
(717) 652-8659	Harrisburg, PA	Colorama	
(801) 544-3423	Clearfield, UT	Time Link	Note 9
(803) 279-5392	Augusta, SC	Augusta Forum TBBS	
(803) 288-0613	Greenville, SC	DLOAD OS-9 BBS	Note 7
(804) 887-5302	Williamsburg, VA	Gamma Color 80	
(805) 484-5491	Camarillo, CA	Colorama	
(805) 687-9400	Santa Barbara, CA	CoCo Corner	HQ SYS
(812) 476-9453	Evansville, IN	Evansville Connection	Note 8
(813) 879-1105	Tampa, FL	The CoCo BBS	
(813) 924-2626	Sarasota, FL	Color-80 #41	
(815) 458-6628	Will County, IL	Colorama	
(816) 232-4932	St.Joseph, MO	The Pony Express	
(817) 641-0133	Cleburne, TX	Dragonfire BBS	Note 9
(902) 683-2086	Port Mouton, Nova Scotia	Colorama	
(902) 857-9843	Hubbards, Nova Scotia	Colorama	
(904) 378-9222	Gainesville, FL	CoCoOS9 BBS	
(913) 384-2196	Kansas City, KS	Online Beta Sigma Pi	
(914) 362-1422	Pomona, NY	Telemation OS9	
(914) 965-2355	Westchester, NY	Westchester BBS	
(914) 965-7600	Yonkers, NY	Colorama	
(916) 381-8788	Sacramento, CA	Sacramento CCC	
(919) 758-5261	Greenville, NC	SangarNet	

NOTES:
1 OS9 Users Group. Type CR/LF until it responds: "Please Log In". Then type HELLO-G500 ,,3ENTER
2 Hours: 2000-1630 Mon.-Fri. 2000-1000 Weekend/Holidays
3 Pro Color File Users Group
4 2200-0800
5 Sat.-Sun. 0600-1000 Mon.-Fri. 1800-1900
6 Mon.-Fri. 2000-0800 Sun. 1800-Mon. 0800
7 Mon.-Sun. 2200-0700
8 Weekends ONLY
9 Evenings and Weekends (Generally after 1700 on weekdays)

Some Other BBSs That May Be Of Interest

Besides bulletin board systems devoted to the Color Computer, an active modem user can find quite a few other BBSs which might be of interest to him.

Here is a look at just a few, one of which is devoted to almost nothing but listings of other BBSs around the world!

---

(312) 545-8086 WARD AND RANDY'S CBBS

Chicago, IL - This is the original bulletin board system, first put together by Ward Christiansen in 1977. Far from resting on its laurels as the first microcomputer BBS, these folks continue to serve the Chicago area as a general interest board.

---

(202) 653-1079 U.S. NAVAL OBSERVATORY

Washington, D.C. - Run by the U.S. Government for the benefit of computer users, including various academic and scientific organizations, the Naval Observatory provides such information as the exact time of day (plus or minus 50ms), sidereal time (astrological time) as well as a program that will give you the sunrise or sunset times for any point on the earth.

This service supports 300 or 1200 Baud operation, 8 bits and even parity must be used.

---

(303) 632-3391 OLD COLORADO CITY ELECTRONIC COTTAGE

Colorado Springs, CO - Featuring a wide diversity of subjects ranging from the current political campaigns to education, this T.B.B.S. gets a wide variety of viewpoints from across the country. An interesting aspect of this BBS is that, unlike many BBSs where the users are mainly interested in computers, the "citizens" of Old Colorado City almost seem to forget they are using computers, preferring to communicate about other subjects of a "grander" scale.

---

(213) 541-2503 R/CPM PALOS VERDES

Palos Verdes, CA - This Remote/CPM BBS is a favorite hang-out for hi-techies, with a healthy dose of amateur radio, to boot. If you're comfortable with hi-tech topics, this BBS will seem like home to you.

---

(817) 246-2532 CAMELOT

White Settlement, TX - On the west side of the Fort Worth-Dallas Metroplex, Camelot is a good example of a BBS that strives to serve the whole computer-user community in a metropolitan area. Local news and information are featured, with a healthy dose of humor thrown in.

---

(213) 842-3322 DIAL YOUR MATCH #1

Los Angeles, CA - Computerized dating services abound across the country with the Dial-Your-Match BBSs. This is the headquarters board, and has the listings of all the other Dial-Your-Match BBSs across the country. Keep trying to get in . . . it's a *very* popular BBS!

---

(303) 340-2473 THE ELECTRIC MAGAZINE

Denver, CO - An "online" magazine, with features ranging from computers to the newest in life styles. Easy reading, and fun!

---

(301) 460-0538 RBBS-PC BETHESDA

Bethesda, MD - This BBS, operated on an IBM PC, features the latest in happenings in the Federal government, as well as medical special interests.

---

(415) 861-6489 CONFERENCE TREE

San Francisco, CA - Originally, this BBS started out looking for a new way to let folks communicate. Instead of the more commonly used "message numbers" that are assigned in numerical order, this BBS uses a "tree," where the original message on a particular subject is followed by replies and other messages about the same topic. To check which conferences are currently active, enter "READ CONFERENCES."

---

(301) 344-9156 NASA G.A.S. NET

Greenbelt, MD - No, it's not hot air from NASA, but rather a BBS devoted to the "Get Away Specials," the experiments carried aboard the Space Shuttle. This BBS always has interesting news about the current space projects, as well as some recognizable names, if you're into space and aeronautics.

---

(713) 483-4115 NASA ACTIVITIES TTY

Johnson Space Center, TX - This BBS details the current projects that NASA's working on, as well as information about the NASA Manned Spaceflight Center in Houston. For an interesting time, see if you can get online with the system during one of the Shuttle flights!

---

(619) 578-2646 KID'S MESSAGE SYSTEM

San Diego, CA - If you're a kid, or interested in helping kids learn more about computers, this might be one of your favorite BBSs. Topics of discussion include educational and practical topics, as well as poetry, short stories and computer art, by kids. Even adults will have fun with this one!

---

(619) 561-7277 P.A.M.S.

Santee, CA - PAMS, the Public Access Message System, features one of the most comprehensive lists of BBSs worldwide, currently over 46,000 bytes long. At last count, there were even 20 BBSs listed outside of the United States and Canada. This is the one to check if you are looking for a BBS in a particular location, or just browsing to see what's available across the country.

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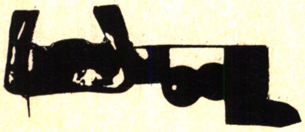

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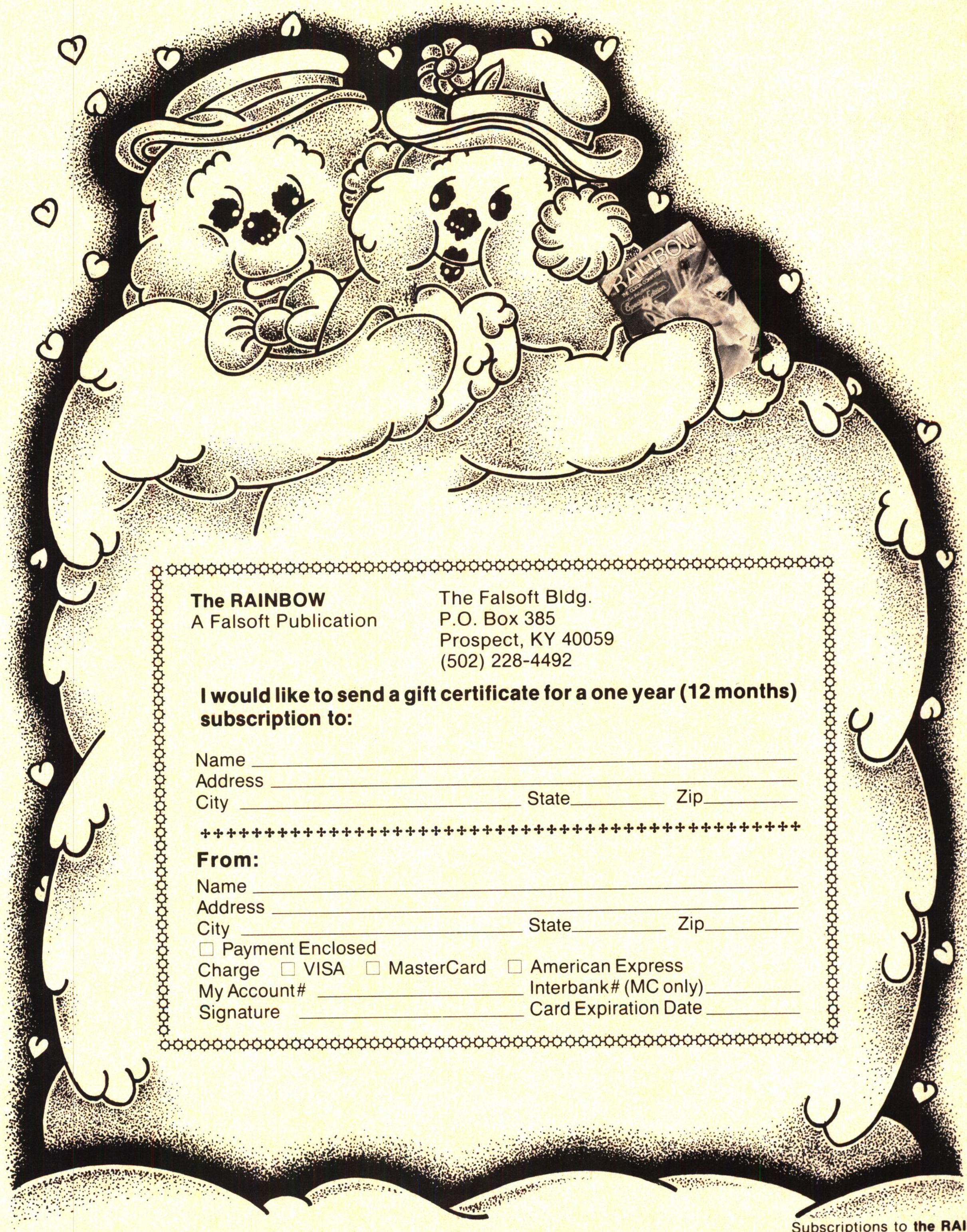

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An in-depth lesson on terminal programs and hints and tips on . . .

Modeming Across America

By Wayne Day
Rainbow Contributing Editor

Last month, we began our journey through the world of telecommunications with a quick look at the basics of what you'll need to get started: your CoCo, a modem, phone line and, of course, a terminal program. This month, we'll expand our look at the terminal program, as well as offer a few hints and tips on successfully "Modeming Across America."

No matter how much RAM you have in your computer, or how much you spend on the latest in "super-techno" autodialing, coffee-making modems, you can't do a thing with them without some sort of terminal program which lets you communicate with the remote information system you're "talking" to, be it CompuServe, a bulletin board system (BBS) or another Coco.

Two functions *must* be accomplished by the terminal program:

1) Each time you press a key on your computer, the terminal program must convert the data generated into ASCII data and send that information out the serial RS-232 port to the modem; and
2) It must convert the data received from the modem (ASCII) into the appropriate signal that's used to generate a character on your screen.

Those are the absolutes — what we might call a "dumb" terminal because it can only do the very simple things.

A good example of a dumb terminal program is the Radio Shack *Videotex* program, which has been available in both tape and ROM cartridge versions. *Videotex* is usually the first communications program to be acquired by most CoCo users, since it is available in every Radio Shack store in the country.

Operation of *Videotex* is simple, merely a matter of plugging the cartridge in, turning the computer on, dialing up the BBS, and away you go. After your online session is over, though, and you've hung up the phone, about the only thing you can do with *Videotex* is review the last few pages of information that *Videotex* has received.

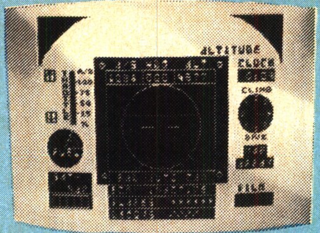
As a dumb terminal, *Videotex* doesn't have any built-in way to send any of the data you received to a printer and you can't store any of the information on disk or tape.

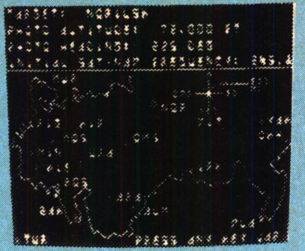
So what can a "smart" terminal program do for you? Let's go back to the very beginning of our telecommunications session, and see how a terminal program with "smarts" could help us out.

Since many of the modems being sold today have the capability of "picking up" the phone and dialing a telephone number, we could ask the terminal to remember our most frequently called numbers for us. Additionally, why would you want to type in the correct login sequence every time you call your favorite BBS or CompuServe? The sequence rarely changes, and it's a time waster for you, right? Let's combine those two features and call them "AUTODIAL and AUTOLOGON."

How does the terminal program remember the numbers and your logon sequence? Our "smart" terminal program lets you build a text file that contains all the information needed, and then recalls that information when you tell it to.

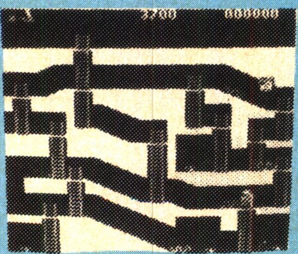
(Wayne Day, a traffic engineering signal technician, is the SYSOP of The Color SIG of CompuServe, the world's largest consumer information service. He is also a certified paramedic and works part-time for an Emergency Medical Service provider. His amateur radio operator call sign is WA5WDB.)





SR-71

SR-71 is a fast action game in which you are the pilot on a mission to take photographs of missile sites in Russia and deliver them to our processing laboratory in Japan. So real you will feel as if you are in the cockpit on a real spy mission. Elude Russian missiles as well as their detection devices. Another Tom Mix exclusive. A must for the adventurous. Fantastic graphics, color and sound. **32K Ext. Basic** **TAPE $28.95** **DISK $31.95**



KING TUT

Journey through the caverns of King Tut's tomb. You are on a quest to find treasurers hidden in the caverns below. You light your way with only a small candle that grows dimmer as time passes. Watch out for the snakes and the ghost of King Tut himself. Five screens challenge your abilities every step of the way. Joysticks required.

16K MACHINE LANGUAGE
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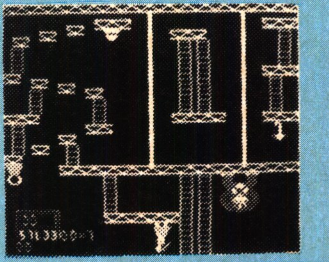

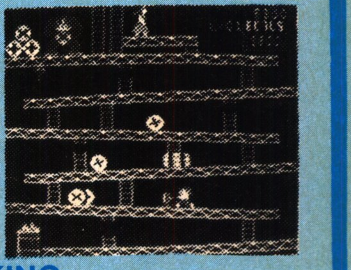

THE KING

This game contains all 4 full graphic screens like the popular arcade game. Exciting sound and realistic graphics. Never before has the color computer seen a game like this. Early reviews say simply outstanding. **JOYSTICKS REQUIRED**

32K MACHINE LANGUAGE
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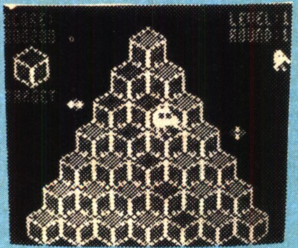

CU ★BER

Approaches the excitement and challenges of any Video Arcade. The hazards of CU ★BER are many. Help CU ★BER change the colors on the pyramid while avoiding many of the dangers always present. Vipers, the Nurd, the Dork, bonus points all add up to another exciting release from Tom Mix Software.

32K MACHINE LANGUAGE TAPE $27.95 **DISK $30.95**

BUZZARD BAIT

We've done it again. You thought The King was great? Wait till you see this! Outstanding high resolution graphics, tremendous sound make this "joust" type game a must for your software collection. As you fly from cloud to cloud you will enjoy sky high excitement dealing with the challenges presented to you by this newest release by Tom Mix Software. Joysticks required.

32K MACHINE LANGUAGE
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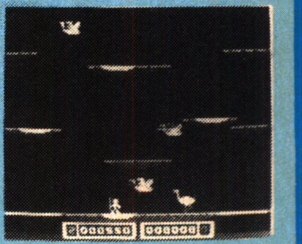
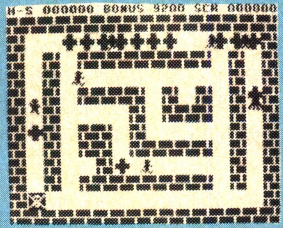


FANGMAN

Fangman is a high-resolution graphics arcade-type game based on the Dracula legend. Plot of Game: You're Dracula in your castle, stalking through a labrynth of passages in search of invading villagers seeking to destroy you by blocking your every path with deadly crosses. Their ally the Sun also wanders your halls, trying to touch you and turn you to bones and dust. Fortunately, you have allies of your own, your vampire bats who chase down the villagers, holding them till you arrive. Joysticks required.

16K MACHINE LANGUAGE
TAPE $24.95 **DISK $27.95**



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16K DISK $49.95 Lowercase displays not available with this program.

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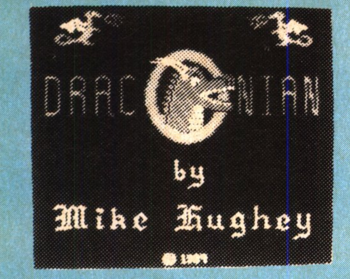
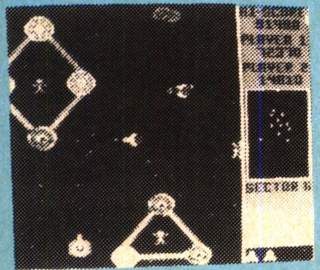




DRACONIAN

You brace yourself as your ship materializes in the enemy sector. Your engine roars to life, and you consult the long-range scanner for the position of the nearest enemy base. As you head for the base, blasting asteroids and space-mines in your path, you suddenly notice a monstrous space-dragon looming before you. Reacting quickly, you dodge his deadly fire-breath and blast him out of existence.

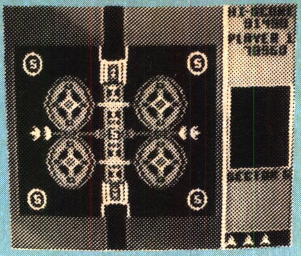
Finally, the enemy base comes into view. Avoiding the enemy fire, you destroy the gun turrets one by one with your rapid-fire torpedoes. Then, with the explosions still echoing around you, you rescue the astronaut who was being held prisoner by the enemy. Your mission is far from over, however, as there are more bases to destroy and more astronauts to rescue before the sector will be secured. And all must be done quickly; if you are too slow, the invincible DRACONIAN will surely seek you out as its next victim.

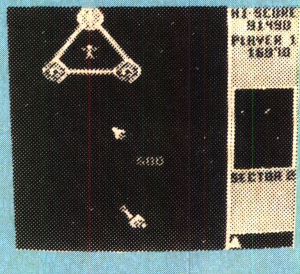
This is it — the single most impressive, awe-inspiring arcade game you can buy for your Color Computer. High-resolution graphics, awesome sound effects, four-voice music, and quality you have to see to believe! Experience the realism of DRACONIAN today!

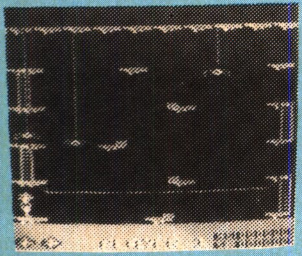
JOYSTICKS REQUIRED

32K MACHINE LANGUAGE

TAPE $27.95 **DISK $30.95**







CRASH

This game is a high resolution Machine Language program with outstanding Arcade type graphics. The game consists of 4 screens. Fly the airplane over and through obstacles. Piloted by "Mario" who also appeard in "The King". The object is to conquer one screen after another but don't "Crash". Great fun for the whole family. For 1 or 2 players. Uses joysticks.

32K MACHINE LANGUAGE

TAPE $24.95 **DISK $27.95**

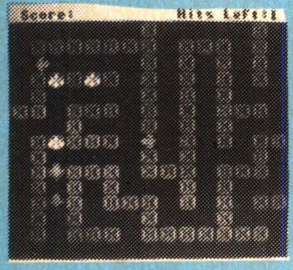
CHAMBERS

Exciting high resolution graphics game. Multiple screens. Outstanding sound, Chambers is loosely based on Cosmic Chasm. The object in each level is to destroy all of the evil creatures in each room and then go into the main reactor room and blow up the base.

JOYSTICKS REQUIRED

32K MACHINE LANGUAGE

TAPE $24.95 **DISK $27.95**



WAREHOUSE MUTANTS

Journey through the warehouse seeking out the Mutants who are out to destroy you. WATCH OUT! They will push crates trying to crush you! Outstanding realism—high resolution graphics—multiple screens.

JOYSTICKS REQUIRED

16K MACH. LANGUAGE

TAPE $24.95

DISK $27.95

QUIX

This one is after a popular arcade game with a similar name. Simply frustrating—you'll love it. Done in high resolution graphics with Super Sound.

JOYSTICKS REQUIRED

32K MACH. LANGUAGE

TAPE $24.95

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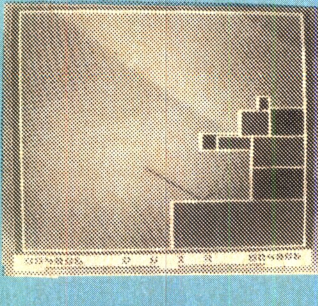

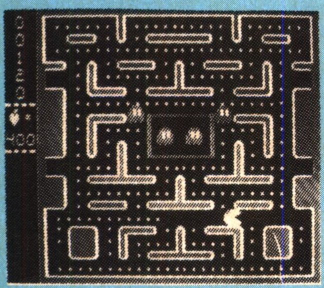

MS. MAZE

MS. MAZE is remarkable in that it combines brilliant color, high resolution, detailed graphics, and music with a very playable game. Anything that could be done to make the Color Computer look and play like the arcade version has been done. MS. MAZE is without question the closest thing to the arcade Pac games that I have seen for the Coco.

JOYSTICKS REQUIRED

32K MACHINE LANGUAGE

TAPE $24.95 **DISK $27.95**

PAK-PANIC

Pakman is steered thru a maze eating dots and powerpills. Pakman is pursued by four monsters who try to catch and kill him. If Pakman eats a powerpill he becomes powerful and can eat monsters. Monsters try to avoid a powerful Pakman. As monsters are eaten their ghosts appear on the top of the screen. When seven ghosts have appeared one will fly across the screen or they will link together forming a centipede that will travel thru the maze. Pakman has no power against ghosts and centipedes and must avoid them or be killed. **JOYSTICKS REQUIRED**

32K MACHINE LANGUAGE

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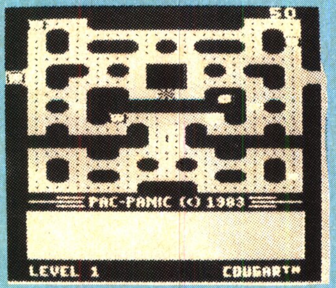

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—As many as 300 vocabulary words and definitions may be in the computer's memory at one time.

—Words and definitions may be saved on disk or tape.

—Remarks and/or comments can be saved with word files.

—A disk loading menu allows students to load disk files without typing file names.

—Word lists may be quickly alphabetized.

—The three printer segments allow you to create and print individualized tests, puzzles, word-searches and worksheets.

—The printer segments allow full use of your printer's special features.

—The 5 game programs are based on sound educational principles and provide practice in identifying words and matching them with their definitions in a fast-paced set of activities.

TAPE $39.95 DISK $42.95

FRACTIONS - A Three Program Package - 32 K EXT. BASIC TAPE $30.95 DISK $35.95

MIXED & IMPROPER

1. Review converting mixed numerals and improper fractions.
2. Practice converting mixed numerals to improper fractions.
3. Practice converting improper fractions to mixed numerals.
4. Practice of both types. (Mixed to improper & improper to mixed)
5. Review converting mixed numerals to mixed numerals. (Used in regrouping in substraction)
6. Practice converting mixed numerals to mixed numerals.

EQUIVALENCE

1. Definitions of terms and review of finding equivalent fractions.
2. Practice finding equivalent fractions.
3. Practice finding sets of equivalent fractions.
4. Review of finding if one fraction is equal to, not equal to, less than or greater than another.
5. Practice finding if one fraction is equal to, not equal to, less than or greater than another.

LOWEST TERMS

1. Review of placing fractions into lowest terms by finding the greatest common factor (GCF) of the numerator and denominator.
2. Practice finding the GCF of pairs of numbers.
3. Practice placing fractions into lowest terms by finding the GCF of the numerator and denominator.

TEACHER'S DATABASE

TEACHER'S DATABASE is a program designed to allow a teacher to keep a computerized file of information about his/her students. There are many features that make this program particularly attractive:

- Information on as many as 100 students (or more) may be in the computer at one time.
- Each student may have as many as 20 (or more) individual items of data in his/her record.
- The program will run from cassette or disk.
- Cassette and disk files are completely compatible.
- The program is menu driven.
- Records may be easily changed, deleted, combined or added.
- Information about students may be numerical or text.
- Records may be quickly alphabetized.
- Records may be sorted by various criteria.
- Records may be reordered (ranked) based on test scores or other data.
- Data displayed during a sort may be printed on a printer or saved on disk or cassette as a new file.
- A full statistical analysis of data may be done and sent to the printer.
- Student test scores may be weighted.

REQUIRES 32K EXT. BASIC
TAPE $39.95 DISK $42.95

MATH DUEL

MATH DUEL is a challenging mathematics game that pits you against the computer it a game of wits. You must use all of your knowledge of factors, multiples and prime numbers to develop a strategy that allows you to gather more numbers and thus more points that than the computer.

The game is deceptively simple. You select the size of the playing field that is composed of from 8 to 100 numbers. You must then choose numbers that will give you the maximum number of points and the computer the least number of points. There are only 6 rules.

1. Any number that you chose must have at least one factor still on the playing field.
2. You receive points equal to the face value of the number that you chose.
3. The computer receives points equal to the face value of all of the remaining factors of the number that you chose.
4. All of the numbers that were awarded to you or to the computer are removed from the field.
5. The game continues until there are no numbers with factors remaining.
6. At the end the computer receives points equal to the value of all of the remaining numbers.

32K EXT. BASIC TAPE $24.95 DISK $29.95

ESTIMATE

ESTIMATE is a program designed to help children to practice estimating the answers to addition, subtraction, multiplication and division problems on the Color Computer. it has many features that make its use particularly attractive.

- Up to 5 students may use the program at the same time.
- There are 5, user modifiable, skill levels.
- The acceptable percent error may be changed as a student's skill improves.
- A timer measures the number of seconds used to answer each problem and the total time used for a series of problems.
- If a problem has been answered incorrectly, the student is told the percent error and asked to try again.
- If a problem is answered incorrectly a second time, the student is told the correct answer and the range of acceptable answers is displayed.
- A report is given at the end of each set of problems that includes the number of problems done, the number of problems answered correctly on the first try and the average percent error.
- The (BREAK) key has been disabled so that child will not inadvertently stop the program from running. **REQUIRES 16K EXT. BASIC**

TAPE $19.95 DISK $22.95

PRE-ALGEBRA I INTEGERS

INTEGERS is a series of four programs designed to give students practice in working with addition, subtraction, multiplication, division and the comparison of integers. It has many features that make a very valuable tool for introducing and/or maintaining skills.

- Up to 4 students may use the program at the same time.
- There are 9, user modifiable, skill levels.
- Students are given two opportunities to answer a problem.
- A detailed report of student performance, including number correct on first try, number wrong, total time used and percentage score, is presented at the end of a series of problems.
- The programs will run on a 16K TRS-80 Color Computer with or without disk drive.

Four distinct problem formats are presented. The first presents problems in this format: −12 + −9 = ? The second program presents a problem with missing numerals in this format: −7 −? = 18. The third program presents a problem with a missing sign: 8 − ?6 = 14. The last program asks the student to determine the relationship (=, ◄ or ►) between two statements 3 −9 (??) −4 −5.

32K EXT. BASIC
TAPE $28.95 DISK $33.95

PRE-ALGEBRA II

The second **PRE-ALGEBRA PACK** is composed of two programs, EQUATION SOLVER AND EQUATION DUEL, that are designed to give students practice in using and solving equations. It has many features that make a very valuable tool for introducing and/or maintaining skills:

- In both programs students may choose the range of numerical values that will be included in the equations so that the difficulty may change as their skill increases.
- In EQUATION SOLVER the computer secretely generates a random equation, shows the numbers that it used in the equation and the answer and challenges the student to create his/her own equation that uses the same numbers and results in the same answer.
- In EQUATION DUEL the student and the computer race to see who will be the first to create an equation from the same set of random numbers.
- Both programs give detailed reports of the student's and the computer's performance in creating and solving equations including time used, score and percentage correct.

32K EXT. BASIC
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For example, let's assume you're calling CompuServe's Consumer Information Service (CIS), and want to build a file that works with your Hayes Smartmodem (a very programmable modem).

First, we've got to get the modem's attention with the "AT" command, followed by the instruction to dial a number, using touch-tones.

Then, when our terminal senses that a connection has been made, we'll tell it to send a CONTROL-C to get CIS's attention, and then to answer the User ID: and Password: prompts, then return control to us.

Thus, our command file might look something like this:

```
CIS            (what we call the file)
AT DT8702461   (Dial the number)
WAIT           (Wait for connect)
$03            (Send a CNTRL-C)
>ID:           (When CIS sends "ID:"...)
71234,5678     (send our User ID)
>word:         (When CIS sends
               Pass(word:)...)
DARING#BIRD    (send our password)
/TERM          (return control to
               operator)
```

The "smart" terminal program could read this file, and execute those commands just exactly as we had entered them ourselves, saving us some time, and more importantly, saving us from having to enter the same thing every day when we log on to CIS.

Other Features

While we're dreaming about what we'd like to put in our smart terminal program, let's think about what we do with all the information that scrolls off our screen.

In our dumb terminal, the data we got from the BBS was lost forever since there was no way to save it.

Aha! Let's make it possible to save anything we get in RAM, so we can look at it later. This feature of a smart terminal program is called a buffer, a temporary storage area.

But, wouldn't the data in the buffer be lost if we turned off the program, or powered-down the computer? Yep, it would, so we'll also include a method by which we can save all or a portion of the buffer to disk or tape, OK?

Receiving data from some other source, such as transferring a program from CompuServe to your own system, is known as "downloading." You can download to a printer, too. So that gives us "DOWNLOAD TO TAPE, DISK OR PRINTER."

What happens, though, if you're on a BBS for an hour, reading messages and looking through the available information, and all you really want to print out is one or two messages?

Ideally, our buffer should be able to be opened and closed two ways. The first method would be under manual control — you decide what you want to save, and what you don't want to save.

Additionally, there are times when the computer should know that you want to save what it's going to send in the next little bit, so there should also be "AUTOMATIC BUFFER CONTROL."

In the world of telecommunications, there have been some unofficial standards set, and one set of those standards says that whenever a terminal program "sees" a CONTROL-R (Hex value $12 — or CHR$(18)), it should OPEN the receive buffer. Conversely, when a CONTROL-T character (Hex $14 - CHR$ (20)) comes down the line, the terminal program should CLOSE the buffer.

> ***"No matter how much RAM you have in your computer, or how much you spend on the latest in 'super-techno' autodialing, coffee-making modems, you can't do a thing with them without some sort of terminal program . . ."***

If the BBS you are using supports the CONTROL-R / CONTROL-T method of buffer control, you wouldn't have to open your buffer yourself when you want to download a program — just let the terminal program do it for you.

By the way, the CONTROL-R/ CONTROL-T characters are also known as DEVICE CONTROL-2 and DEVICE CONTROL-4, depending on whose list of control codes you're looking at. The important thing to remember, though, is that they are the same thing, no matter what they are called.

Do all BBS and information services use CONTROL-R / CONTROL-T? No, they don't, so in our "smart" terminal that we're working on, we would also like the ability to define just which particular character will be recognized as the "OPEN BUFFER" character, and which one will work as the "CLOSE BUFFER" control code.

So, in this case, we'll also include "DEFINABLE CONTROL CHARACTERS" in our list of desired features.

Let's Send It The Other Way

When you send pre-stored information to another computer, be it a BBS or a consumer-oriented information service, you "UPLOAD" the file, the opposite of "DOWNLOAD."

This can be extremely cost-effective if, for example, you are using a service where time is at a premium, or where you are charged by the minute of connect time.

Using your favorite word processor or a home-brewed message generator, you can compose messages before you connect your modem and have everything ready to go at the touch of a single key.

Where are you going to get the info? Again, it would be nice if you had the option of reading in a text file from either the cassette or disk, so we'll include "UPLOAD FROM TAPE OR DISK" in our list of things to have.

Are We Still Talking ASCII?

So far, we've assumed that all of our communications will be taking place using ASCII, those first 128 characters of the possible 255 that the CoCo can generate.

Is there anything besides ASCII?

Yes, and it's called binary.

Let's assume you have built a BASIC program that you want to save to disk.

Normally, you would enter:

```
SAVE "PROGRAM.BAS"
ENTER
```

But, if you entered:

```
SAVE "PROGRAM.BAS",A
ENTER
```

you would save the program on disk in ASCII format.

What's the difference, since both would load into the computer and run?

BASIC uses "tokens," a one-character or two-character symbol for certain words in the BASIC command library. Thus, instead of writing "RESTORE" on a disk, BASIC normally just writes a CHR$(143), saving six bytes on the disk. Follow that through with the whole program and you can see that tokenizing commands and keywords can save quite a bit of space in the long run.

What's that got to do with our "smart terminal program"? Look at the value of RESTORE. It's 143, above what is normally recognized in the ASCII "language."

An Apple computer, for example, wouldn't recognize that character as "RESTORE."

That's why ASCII was created, so all computers would have a common language that they could all recognize. And that's fine if we're only sending and receiving text or ASCII programs, but what happens when we want to receive a machine language program? ML programs need the whole range of values from 0 to 255, unlike an ASCII BASIC program.

We'll have to include non-ASCII uploading and downloading in our program then, and that will require the ability to send and receive eight data bits, since seven data bits are normally used on most BBSs and information services.

```
binary  1 1 1 1 1 1 1 = 128
       1 1 1 1 1 1 1 1 = 255
```

That means we need to be able to set "COMMUNICATIONS PARAMETERS." Normally, besides the data length of a "word," most full-featured terminal programs also allow you to specify the speed at which the data will be sent (300 and 1200 Baud are the most commonly used), the number of "stop bits" in a data word, as well as parity.

Parity is used to help insure a good transmission of data, and is used to verify that the proper data was sent.

Even parity means that the sum of all the bits in the "word" being sent will be equal to an even number. If the result of just the data is an odd number, an extra "1" value will be added to the word to bring the total value up to an even number.

For example, in a seven-bit word:

```
 1   0   0   1   1   0   0
(1) (2) (3) (4) (5) (6) (7)
```

is an odd number. Since there are only three ones, even parity would make the eighth bit of the data word become another "1" and the result would be sent as:

```
 1   0   0   1   1   0   0   1
(1) (2) (3) (4) (5) (6) (7) (8)
```

On the other hand, the first seven bits in the next word, the data itself, adds up to an even number, so the eighth bit, the parity bit, is set to a zero, changing nothing.

```
 0   1   1   0   1   1   0   0
(1) (2) (3) (4) (5) (6) (7) (8)
```

Since it depends on which parity the host computer is expecting, our terminal program needs to be able to send either even or odd parity, ignore parity entirely, or always set the parity bit to a

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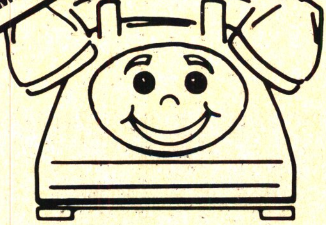

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"1", or always set it to a "0".

Is Parity Foolproof?

Unfortunately, parity is not foolproof, and a noisy telephone line can do horrendous things to the 32K worth of BASIC program you just downloaded from your favorite BBS.

With that in mind, let's add an "ERROR-CHECKING and ERROR-CORRECTING PROTOCOL" to our terminal program, so we can be sure to get the most out of our online time.

A protocol is merely a set of rules: in this case, the rules by which an accurate transfer of data will take place from one system to another. Several such protocols exist for the Color Computer today.

In the general world of microcomputers, perhaps the most popular error-checking protocol is known as "XMODEM."

XMODEM was created in 1982 by Ward Christiansen, founder of the first BBS system (Ward and Randy's CBBS, Chicago, 1977 — see the list of BBSs in this issue of THE RAINBOW) and was originally written for the CP/M operating system.

It works like this:

The sending computer loads in the file, be it a BASIC program, a machine language program, or a text file (it doesn't matter to XMODEM), and looks at the first 128 bytes of the file.

It adds up all the values in the first 128 bytes, and remembers that number, called a checksum, just like *Rainbow Check Plus* used here in THE RAINBOW to make sure you typed the correct information into your computer (See the "Rainbow Info" page).

When the receiving computer is ready, it sends a signal to the sender which starts throwing the data out, one byte at a time. Following the last byte of data, the sender adds the checksum it computed earlier.

The receiving computer, while all this is going on, is also keeping track of what it has received, and computes its own version of the checksum.

If the two checksums agree, the receiver signals the sender that all is well, and to continue.

If the checksums are not equal, though, the entire block of 128 bytes of data is re-sent, and the process is repeated.

This way, you're sure that what you sent is what the other end received, and vice versa — error-checking and error-correcting.

The popularity of XMODEM comes into play when you consider that it is the standard file transfer method on the majority of BBS systems that offer any sort of error-checking and error-correcting protocol.

For the TRS-80, the popular TBBS Bulletin Board program supports XMODEM, as does a recently announced BBS program for the CoCo, *COBBS*.

Is XMODEM Standard?

There are many other error-checking protocols in use, and unfortunately, most of them are not compatible with each other.

DFT (Direct File Transfer) for the TRS-80 series of computers (Model I, Model III/4 and CoCo), for example, uses a 256-byte block of data, and a different series of commands between the sender and receiver.

For CompuServe users, CIS offers not one, but two error-checking protocols of its own design, the CompuServe "A" protocol, and the CIS "B" protocol that's used in CIS's CoCo

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Each of the protocols has its advantages, and each has its own disadvantage, the biggest of which may be that not enough systems support that particular protocol.

What it all boils down to is that the particular protocol you will need will depend upon which protocol is in use by the host computer you call.

CompuServe's CIS, for example, has recently begun to support XMODEM in addition to its own protocols, due to the large number of terminal programs for all computers that support XMODEM.

In our "smart" terminal program wish list, then, let's assume we'll add the XMODEM protocol to the program, because of the popularity of the protocol on many BBS systems around the country.

However, if we also wanted to exchange programs with another Color Computer user, we could use almost any of the protocols available. So again, let me emphasize that the particular protocol you "need" will be dependent on what you're going to do with the terminal program. In this case, it's best to investigate all of the possibilities.

Is That About It?

We could also add the ability to send some pre-programmed but standard sentences, display the characters on a high resolution 51x24 or 64x24 screen, instead of the 32x16 screen normally seen on the Coco, and a few of the other "bells and whistles" that make each individual terminal program different, but I think you might have a good idea of what's really needed.

And so, the bottom line: Is there any terminal program available that does everything that we could possibly want it to do?

I haven't been able to find one for the CoCo, nor for any other computer, for that matter. And, if *you* find one, I wish you'd let me know.

Each of the terminal programs available for the CoCo today has, in my personal opinion, its own pluses and minuses.

There *are* programs available that do a large majority of the things on our wish list, the major thing lacking in most terminal programs being protocol uploading and downloading.

The idea here is that you should carefully read the advertisements, write for literature, and investigate your purchase before you commit yourself to just one terminal program.

Or, you can work another strategy, and do as I do, and use several different terminal programs, each one working well for a particular application.

For example, when I'm performing my SYSOP duties on The Color SIG (Special Interest Group) on CompuServe, I may be using one of the programs that works well at 1200 Baud (not all of them do), so I can rapidly read and reply to messages, work on my system files, and maintain the SIG's database.

When I want to upload or download an ASCII text file, I may choose a different program, one that only runs at 300 Baud, but is easy to use to upload and download files. And, when I'm working with a binary file, like a machine language program or a graphics screen, I probably will use a third terminal program.

So, as you can see, the terminal program, or programs, you choose are vitally important, and you should make your purchase decisions wisely.

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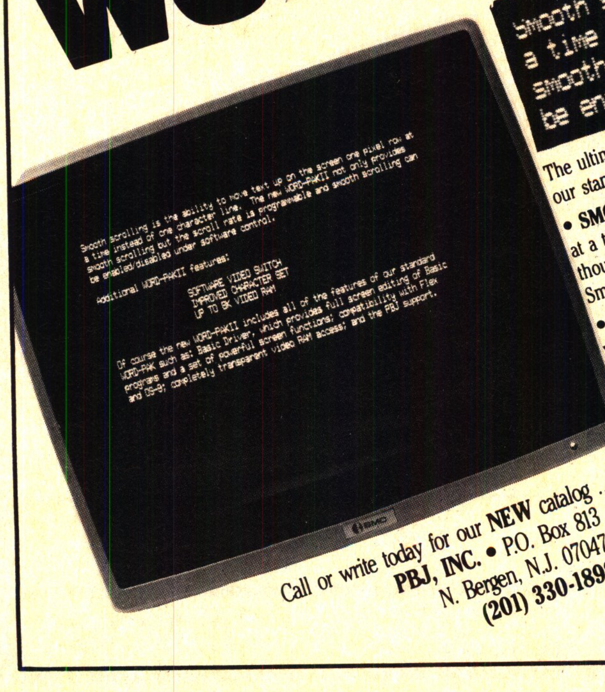

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(Well-known author Bob Albrecht also writes the "Game Master's Apprentice" feature for The Rainbow each month. Ramon Zamora is author and co-author of several books, co-founder of ComputerTown USA!, *and currently designing computer games for kids at Child Ware Corp. in Menlo Park, Calif.)*

We are looking, mostly in vain, for *easy-to-play* Adventure games rated G. We are tired of games that depend on killing as the way to success. So we are happy to recommend an Adventure game for you and your child. Sheri Bakun reports on her first experiences with *MYHOUSE*, one side of *Adventure Starter* from Owls Nest Software:

> *MYHOUSE* is a game that you and your child can enjoy playing together. A text Adventure designed for the young player, it is a fun introduction to this type of game for players of any age. Adventure games are very popular with adults and until recently there were none available for young children.
>
> In an Adventure game, the player explores a world — real or fantasy — in search of a goal, usually some type of hidden treasure. This world can be as simple as a house, as in *MYHOUSE*, or as complicated as a whole galaxy. It may take a few hours or several months to reach the Adventurer's goal.
>
> *MYHOUSE* takes a few hours to solve and will interest children six and up. It is a game you can play one day, and return to later using what you have already learned.
>
> After loading *MYHOUSE*, you see:

```
WELCOME TO MY HOUSE. YOUR OBJECT
IS TO FIND A HIDDEN GOLDEN COIN
AND RETURN TO THE FRONT PORCH
            —GOOD LUCK!—
HIT ANY KEY WHEN READY
```

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System includes 26-3134/1192/1209/3020/2568/2569/3008.

You explore the house by typing one- or two-word commands. The vocabulary available is limited and part of the challenge of Adventure games is discovering new words that will be "understood." The computer responds to your commands in three ways: by telling you it doesn't understand the request; by performing the appropriate action; or by telling you it is unable to do what you ask. For example, the computer might ask, "WHAT SHOULD I DO?" If you type "OPEN DOOR," the response may be "IT'S LOCKED" or "OK, IT'S OPEN."

The computer understands words such as "GET," "OPEN," "LOOK" and "READ." Whenever you type "LOOK," the computer responds by telling you where you are, what you see, and in which directions you may go.

Movement is specified by the compass directions north, south, east, and west, and by up and down. When exploring *MYHOUSE* with your child, you may wish to make a map of the house. Mark the starting point in the center of a large sheet of paper. Using standard map notation, north will be at the top. We suggest that as each new room is entered, you and your child discuss where on the map that room should be drawn. It is also helpful to write down what you see in each room for future reference.

Our six- and seven-year-old playtesters found that spelling and typing slowed down their exploration. Try taking turns being typist to ease this frustration. Or maybe you can type the two-word commands and your child the shorter ones. [Laran Stardrake says: "Dual mode — Play together. Let the child tell you when she or he wants solo mode, trying it alone."] *

MYHOUSE provides an introduction to map making and practice in the skills of logical thinking and deductive reasoning. It is also fun to play, and children like to solve the mystery more than once. Eventually you and your child will want to try the more challenging *Pirates Adventure* on the other side of the cassette.

We encourage all of you who want to try an easy Adventure game with your kids to get this Adventure and do it. Please share your experiences with us. We will continue playing *MYHOUSE* with kids and share our experiences with you. Why do we choose *MYHOUSE*? Because it is the only *nonviolent, easy-to-play* Adventure game we know of for a 16K CoCo with Extended Color BASIC.

(*Adventure Starter* from Owls Nest Software, P.O. Box 579, Ooltewah, TN 37363. For 16K Extended Color BASIC. On cassette for $17.95 postpaid)

Special Kudos!

Owls Nest encourages you to make backup copies of the two Adventure games in *Adventure Starter* and tells you how to make them.

WANTED: Nonviolent, easy-to-play Adventure games. We especially want games suitable for parents and young child to play together. Why do all you Adventure game-designers spend your time making increasingly more difficult games for the "elite" and "sophisticated" player? The world is full of beginners. Why not make beautiful games for them? Instead of selling 1,000 incredibly complex games to the Adventure game cult, why not sell 100,000 beautiful, nonviolent games to beginners?

WANTED: Nonviolent Adventure games with several levels of play. A beginner starts with an easy game and is guaranteed moderate success, then moves up to a more difficult level, and so on. Focus on exploration and problem-solving instead of "kill monster, get treasure." Make your games realistic fantasies. (As Laran Stardrake once said, "Reality expands to fill the available fantasies.")

We will expand on this in future episodes of "School Is In The Heart Of A Child." We will suggest Adventure game environments and scenarios dear to our hearts. We will gladly give away ideas to any cottage company that wants to help create wonderment for children. We would love to playtest nonviolent Adventure games for all you publishers and help you bring to people the next generation of Adventure games, the games for "the rest of us."

GATEWAY TO ADVENTURE

Guess My Word

Sheri Bakun and her kids played last month's *Guess My Word* game. They offer a replacement for block 600 to make the game easier and more fun to play. In case you missed our last episode, here is the complete listing of the program, including the new block 600.

* Thanks, Dr. Thomas Dwyer, for teaching all of us about dual mode and solo mode in your pioneering projects.

```
500 ....... 63
30000 ... 189
END .... 204
```

The listing:

```
100 REM**GUESS MY WORD SCH 9-1
110 CLEAR 2000: DIM WORD$(200)
120 CLS
130 PRINT "GUESS MY WORD GAME"
140 PRINT
150 PRINT "I'M MEMORIZING WORDS.
"
199 '
200 REM**READ & COUNT WORDS
210 NW = 0
220 NW = NW + 1
230 READ WORD$(NW)
240 IF WORD$(NW)<>"***" THEN 220
250 NW = NW - 1
299 '
300 REM**TELL HOW TO PLAY
310 CLS
320 PRINT "I'LL THINK OF A 3-LET
TER WORD."
330 PRINT "MY WORD IS BETWEEN AA
A AND ZZZ."
340 PRINT
350 PRINT "MY LOWEST 'WORD' IS A
AA."
360 PRINT "MY HIGHEST 'WORD' IS
ZZZ."
370 PRINT: PRINT "PRESS ANY KEY
AND WE'LL PLAY";
380 XX = RND(NW): IF INKEY$=""
THEN 380
390 PRINT
399 '
400 REM**PICK A RANDOM WORD
410 RW = RND(NW): W$ = WORD$(RW)
499 '
500 REM**GET GUESS
510 PRINT: INPUT "YOUR GUESS";G$
599 '
600 REM**IF INCORRECT, GIVE CLUE
610 IF G$=W$ THEN 710
620 W1$ = LEFT$(W$,1)
630 G1$ = LEFT$(G$,1)
640 D = ABS(ASC(W1$) - ASC(G1$))
650 IF D=0 AND G$<W$ THEN PRINT
"YOU ARE HOT! TRY A HIGHER WORD.
": GOTO 510
655 IF D=0 AND G$>W$ THEN PRINT
"YOU ARE HOT! TRY A LOWER WORD."
: GOTO 510
660 IF D<5 AND G$<W$ THEN PRINT
"YOU ARE WARM. TRY A HIGHER WORD
.": GOTO 510
665 IF D<5 AND G$>W$ THEN PRINT
"YOU ARE WARM. TRY A LOWER WORD.
": GOTO 510
670 IF G$<W$ THEN PRINT "YOU ARE
 COOL. TRY A HIGHER WORD.": GOTO
 510
675 IF G$>W$ THEN PRINT "YOU ARE
 COOL. TRY A LOWER WORD.": GOTO
510
699 '
700 REM**WINNER!
710 CLS
720 PRINT "THAT'S IT! YOU GUESSE
D MY WORD."
730 FOR K=1 TO 50
740 : SP = RND(507)
750 : TN = RND(255)
760 : PRINT @SP, W$;
770 : SOUND TN, 1
780 NEXT K
799 '
800 REM**TELL HOW TO PLAY AGAIN
810 PRINT @448, CHR$(30)
820 PRINT @480, "TO PLAY AGAIN,
PRESS SPACE" CHR$(30);
830 K$=INKEY$:IF K$="" THEN 830
840 IF K$=" " THEN 310 ELSE 830
899 '
30000 REM**WORD LIST
30100 DATA ADD,AGE,AIR,ALL,AND
30110 DATA ANT,ANY,ARE,ARM,ASK
30200 DATA BAD,BAG,BAT,BED,BEE
30210 DATA BIG,BOW,BOX,BOY,BUS
30220 DATA BUT,BUY
30300 DATA CAN,CAP,CAR,CAT,COW
30310 DATA CRY,CUP,CUT
30400 DATA DAY,DIE,DIG,DOG,DOT
30410 DATA DRY,DUG
30500 DATA EAR,EAT,EGG,END,EYE
30600 DATA FAN,FAR,FAT,FEW,FIT
30610 DATA FIX,FLY,FOX,FUN,FUR
30700 DATA GAS,GEE,GET,GNU,GOT
30800 DATA HAT,HAY,HEN,HER,HIM
30810 DATA HIP,HIS,HIT,HOP,HOT
30820 DATA HOW,HUG
30900 DATA ICE,IMP,INK,ITS
31000 DATA JAM,JAR,JET,JOB,JOG
31100 DATA KEY,KID
31200 DATA LAY,LEG,LET,LID,LIE
31210 DATA LOT,LOW,LUG
31300 DATA MAD,MAN,MAP,MAY,MIX
31310 DATA MOP,MUG
31400 DATA NAP,NET,NEW,NOD,NOT
```

```
31410 DATA NOW,NUT
31500 DATA ODD,OFF,OLD,ONE,OUR
31510 DATA OUT,OWN
31600 DATA PAL,PAN,PAT,PAY,PEA
31610 DATA PEN,PET,PIE,PIG,PIN
31620 DATA POT,PUT
31800 DATA RAN,RAT,RAW,RED,RUB
31810 DATA RUG,RUN
31900 DATA SAD,SAT,SAW,SAY,SEA
31910 DATA SEE,SET,SEW,SHE,SIP
31920 DATA SIT,SIX,SKY,SON,SUN
32000 DATA TAG,TAN,TAP,TAX,TEA
32010 DATA TEN,THE,TIE,TOE,TOO
32020 DATA TOP,TOY,TRY,TUG,TWO
32100 DATA UFO,USE
32200 DATA VAN,VOW
32300 DATA WAG,WAS,WAY,WEB,WET
32310 DATA WHO,WHY,WIN,WON
32500 DATA YAK,YAP,YES,YOU
32600 DATA ZAP,ZEN,ZOO
32700 DATA ***
```

Block 600 computes the ASCII code of the first letters in W$ and G$, then computes the distance (D) between these letters. If the first letters in the CoCo's secret word and the player's guess are the same, the CoCo tells you "YOU ARE HOT!" and which way to go (Lines 650 and 655). If the letters are not the same, but within four letters, CoCo says "YOU ARE WARM" and tells you which way to try (Lines 660 and 665). If the first letter of the guess is five or more letters from the first letter of CoCo's word, Lines 670 and 675 tell you "YOU ARE COOL" and tell you which way to go.

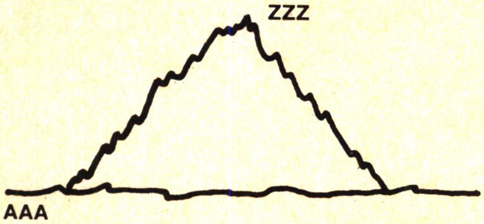
We encourage you to let the child play and discover these things herself.

Here are more variations of *Guess My Word*. You can modify our program to use different kinds of hints.

— Instead of "YOU ARE HOT" or "YOU ARE WARM" or "YOU ARE COOL," use a stripe of color. Use red for hot, orange or yellow for warm, blue for cool . . . or pick your own colors.

— Use sound as a clue. The closer the guess is to the word, the higher the sound. Or, if you prefer, the closer you are, the lower the sound.

— You could also use a sequence of sounds to tell people which way to go. Rising sounds mean go up the mountain towards ZZZ. Descending sounds mean go down the mountain towards AAA.



Reverse Strategies

First, here are the answers to the questions from last time's problems. We asked you to complete the reversing of 4 3 2 5 1 in three or more reversals.

Start: 4 3 2 5 1
Reverse 3: 2 3 4 5 1
Reverse 4: 5 4 3 2 1
Reverse 5: 1 2 3 4 5 DONE.

Here are our solutions to the other four problems.

(1) Start: 5 4 3 2 1
Reverse 5: 1 2 3 4 5 One move.

(2) Start: 4 5 3 2 1
Reverse 2: 5 4 3 2 1
Reverse 5: 1 2 3 4 5 Two moves.

(3) Start: 2 1 4 5 3
Reverse 4: 5 4 1 2 3
Reverse 5: 3 2 1 4 5
Reverse 3: 1 2 3 4 5 Three moves

(4) First method.
Start: 3 2 5 4 1
Reverse 3: 5 2 3 4 1
Reverse 5: 1 4 3 2 5
Reverse 2: 4 1 3 2 5
Reverse 4: 2 3 1 4 5
Reverse 2: 3 2 1 4 5
Reverse 3: 1 2 3 4 5 Six moves.

(4) Second method.
Start: 3 2 5 4 1
Reverse 2: 2 3 5 4 1
Reverse 4: 4 5 3 2 1
Reverse 2: 5 4 3 2 1
Reverse 5: 1 2 3 4 5 Four moves.

For a list of five numbers, you can *always* do it in (at most) seven moves. Usually, you can do it in fewer moves. For the same list, try several ways and do it in as few moves as possible. In general, for a list of N numbers (1 to N scrambled), you can put the list in order in (at most) 2N–3 moves. But try to do better!

Try six numbers. You can do any list in 2 x 6 – 3 = 9 moves or less. Try for less!

(1) 4 1 3 6 2 5 (2) 3 6 2 4 5 1

Next, try seven numbers in 2 x 7 – 3 = 11 moves or less.

(3) 1 4 7 2 5 3 6 (4) 2 7 4 6 3 1 5

Any program to let you play REVERSE should have the option of trying the same list again or getting a new list.

We Love The Letters!

We especially love this one from Mike Knolhoff.

Dear Bob and Ramon,

Many of the parents who read your columns probably write some of their own educational programs for their young children. I would like to share an experience I had with my own young daughter in hopes that other parents will not make the same mistake that I did.

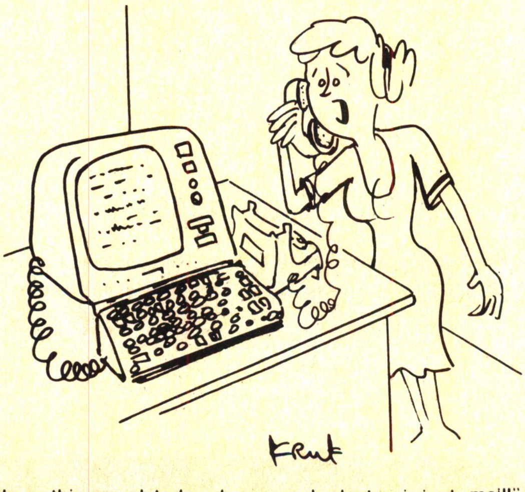
One of the most important reasons why my wife and I bought our CoCo nearly three years ago was to help educate our young children. Our oldest child at that time was three years old. One of the first programs I wrote for her was a counting game which put a random number (one through nine) of colored boxes on the screen. She would count the boxes and press the correct number on the keyboard. If she pressed the correct number key, she was greeted by an eye-blinking smiley face and a happy tune to let her know she had pressed the right key. If she was wrong, however, she got a low tone and a frowning face.

At first she played the game with quite a bit of enthusiasm. But soon she started hiding her eyes each time she got a wrong answer to avoid seeing the frowning face. Each time she sat at the computer to play the game she became more and more fearful of getting a wrong answer. She wouldn't want to press the ENTER key, if she wasn't completely certain she had the right number. After a while she quit playing the game altogether. No matter how much my wife and I explained that it was all right to make mistakes, it didn't matter. She did not want to risk failure again. Not only did she not want to play that particular game, she became fearful of all computer games. For a long time she did not want to play any computer games. By that time I had removed the frowning face from the counting program, but still she would not play the game. Now my daughter is five and is starting to get interested in the computer again, thanks to LOGO. She still has reservations about using the computer and is still fearful of doing something wrong, but she is rapidly gaining confidence again.

The moral of this letter for all your readers is that *no* feedback on incorrect answers is better than *negative* feedback. For the very young computer users at home it's better to simply ignore incorrect answers and wait for the correct answer to be given than to provide any type of visual or audio feedback for them. By the way, my two-and-a-half-year-old son is just starting to use the counting program (without the frowning face) and seems to be enjoying it!

Sincerely,
Mike Knolhoff

P.S. Ramon, I enjoyed your chapter, "The Pedagogy of Games," in *Intelligent Schoolhouse*. I would recommend that all educators and any parents interested in the educational uses of computers read this book which is published by Reston Publishing Company.



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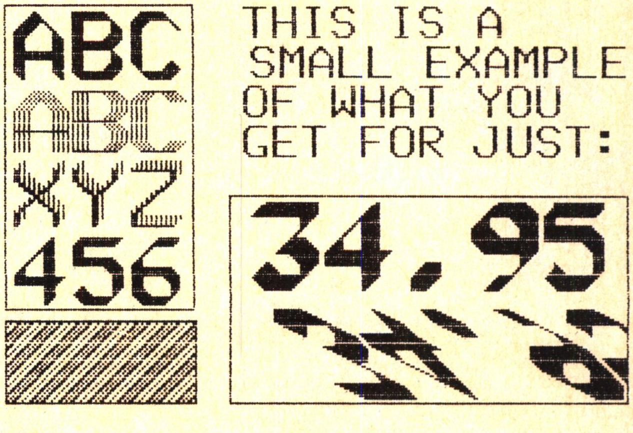
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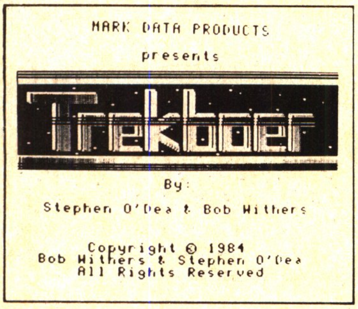

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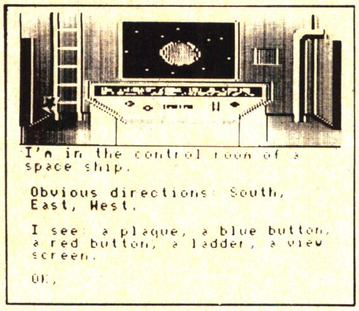

```
I'm in the control room of a
space ship.

Obvious directions: South,
East, West.

I see: a plaque, a blue button,
a red button, a ladder, a view
screen.

OK,
```

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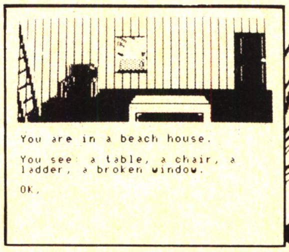


```
You are in a beach house.

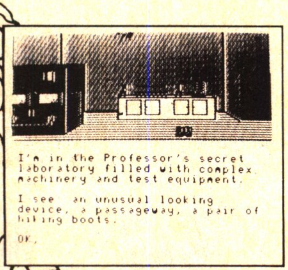
You see: a table, a chair, a
ladder, a broken window.

OK,
```

SEA SEARCH

Get your shark repellant and scuba tanks ready! The graphics in this adventure are truly outstanding and the underwater scenes are unforgettable. You'll run into a pirate, a mermaid and some hungry sharks in this colorful and unique treasure hunt. 32K required.

Hot CoCo—April '84 "The fine graphics accent your imagination."



```
I'm in the Professor's secret
laboratory filled with complex
machinery and test equipment.

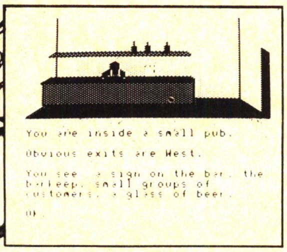
I see: an unusual looking
device, a passageway, a pair of
hiking boots.

OK,
```

CALIXTO ISLAND

A valuable museum treasure has been stolen, can you recover it??? This is a challenging puzzle with an occasional twist of humor. You'll visit a secret laboratory, a Mayan pyramid and you'll meet crazy Trader Jack—all in living color and exciting detail. You will really love this hi-res graphic version of the classic Calixto Island Adventure. 32K required.

Rainbow—April '84 "It was enough to keep my wife and 8 year old son glued to the computer for an entire weekend and two week nights."



```
You are inside a small pub.

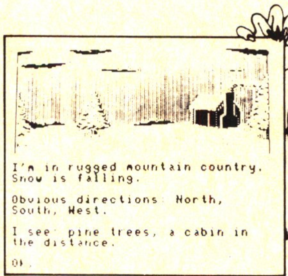
Obvious exits are West.

You see: a sign on the bar, the
barkeep, small groups of
customers, a glass of beer.

OK,
```

SHENANIGANS

Countless legends tell of a magnificent Pot of Gold hidden at the end of the rainbow. Many have attempted to find the marvelous treasure but success has eluded them and it remains hidden to this day. You, as a dedicated adventurer, have determined to search for the fabled riches and succeed where others have failed. This one is great fun! 32K required.



```
I'm in rugged mountain country.
Snow is falling.

Obvious directions: North,
South, West.

I see: pine trees, a cabin in
the distance.

OK,
```

BLACK SANCTUM

Encounter the forces of black magic as you roam around an old 18th century monastery. You'll see all the evil locations in this spooky adventure; you'll love searching out and destroying the evil in this classic tale. A MUST for every adventure game fan! 32K required.

Rainbow—May '84 "It's the graphic screens that are the shining stars...Some of the best I've seen."

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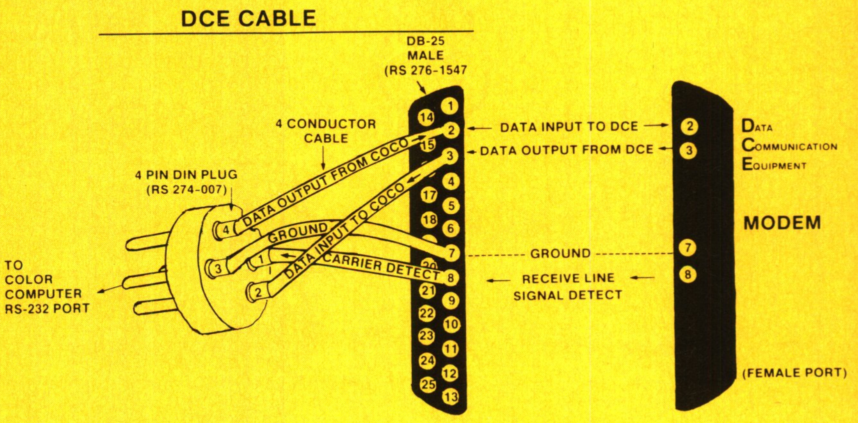
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COLOR
COMPUTER
RS-232 PORT
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DATA INPUT TO DCE
DATA OUTPUT FROM DCE
GROUND
RECEIVE LINE
SIGNAL DETECT
DATA
COMMUNICATION
EQUIPMENT
MODEM
(FEMALE PORT)

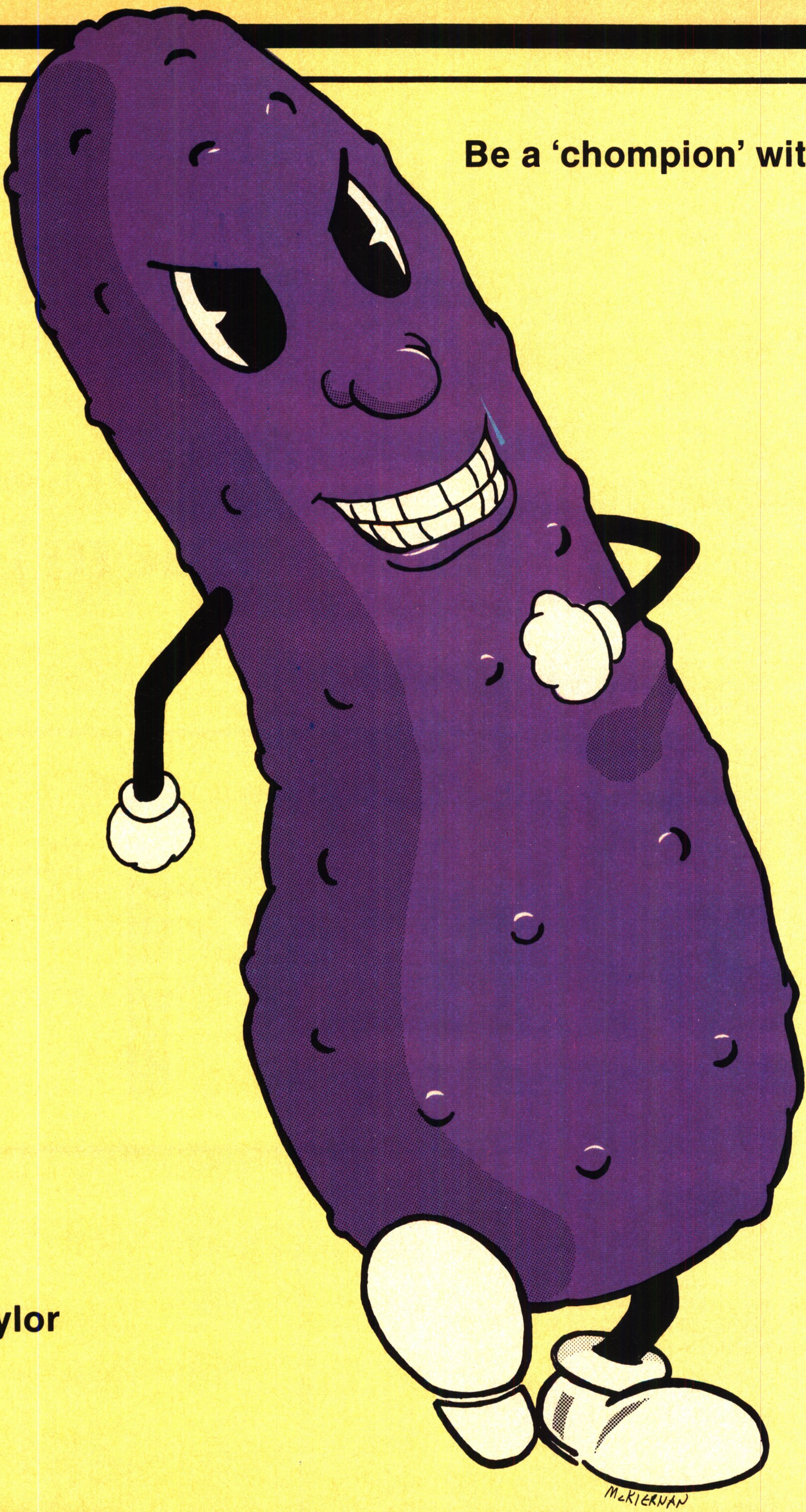
By Helene M. LaBonville

I recently acquired a discarded Multi Tech Systems FM300 Data Coupler, and had naively thought that I could interface it directly to CoCo via RS cable 26-3014 ($19.95). Wrong! As I discovered, both the computer and the modem are, by EIA (Electronics Industries Association) definition, DCE and similar equipment can be connected only through an adapter cable which interchanges various pairs of pins. The essential difference between DCE and DTE (for this discussion) is that pin 2 of the DTE is defined as a data output from the terminal, while pin 3 is defined as data input to the terminal, pin 2 of the DCE is defined as data input to the device, while pin 3 is defined as data output from the device. The RS cable was configured to connect to D(ata) T(erminal) E(quipment) . . . as I later found out, this cable worked perfectly when I connected it to an Apple II for data terminal communication.

I had two options at this point:

1. Reconfigure the RS cable for DCE . . . by reversing the connections between pins 2 and 3 at the DB-25 connector.
2. Make my own.

I chose to make my own. You will need a 4-pin DIN plug (RS 274-007--$1.49), a length of 4-conductor cable, a DB-25 connector (I required a male [RS 276-1547-$2.99]), optional hood (RS 276-1549-$1.99). If you can't find cable, purchase RS cable #26-3020 ($4.95) and remove one of the 4-pin DIN plugs. Note: This homemade cable cost less than $12. I use the following cable to interface the Multi Tech Modem and an Anderson-Jacobsen Modem to my CoCo.



Be a 'chompion' with . . .

By D. Taylor

JUNK FOOD

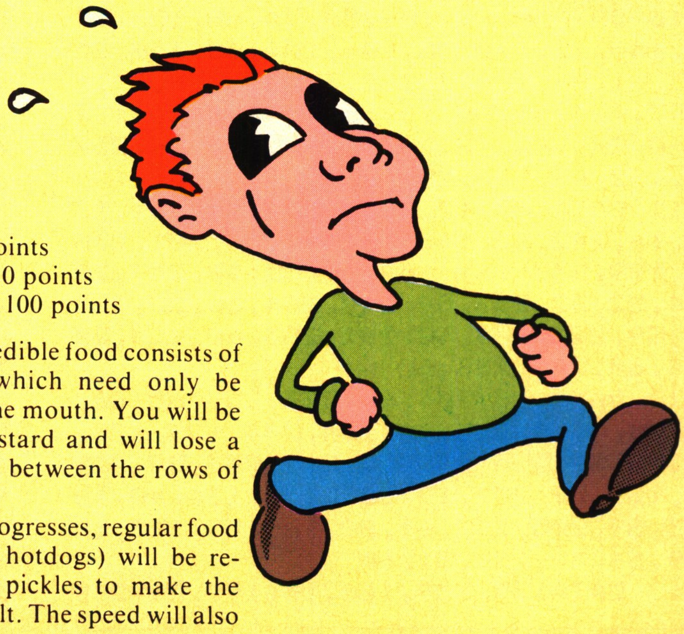
If you have a palate for some mouth-watering fun, you'll love *Junkfood*. The object of this 16K non-Extended BASIC game is to let your hungry mouth, controlled by your right joystick, eat all the "edible" foods to gain as many points as possible — but watch out for those purple pickles, they give you more than heartburn, they're deadly!

Upon execution of *Junkfood*, the title screen will be displayed. Press the right joystick fire button to begin the game. You will have three mouths, or lives, in a game. The food scrolls in rows from left to right and you must maneuver your mouth (up and down only) to chomp as much edible food as you can. Edible food and their points are:

Hotdogs - 10 points
Hamburgers - 10 points
Green Pickles - 100 points

The menu of inedible food consists of purple pickles, which need only be touched to lose one mouth. You will be squirted with mustard and will lose a mouth if you stay between the rows of food too long.

As *Junkfood* progresses, regular food (hamburgers and hotdogs) will be replaced by purple pickles to make the game more difficult. The speed will also



increase. When all regular food has been replaced and the maximum speed is reached, the game will stop momentarily and you will be rewarded 1,000 points. The round will then be reset with regular food, including green pickles, and with a few more purple pickles added between spaces of food.

If you lose a mouth in the middle of a round, the round will be reset, maintaining that level of difficulty. After losing a mouth, press the fire button to continue.

After completing *Junkfood*, the high scoreboard will appear. Your score is displayed near the top-left corner and the highest three scores will appear in the middle of the screen. If you have a high score, the new high scoreboard will be displayed. Use the joystick to control the three initial boxes by moving the joystick to the left, to decrease the order of the letters, or to the right, to increase the order. When the correct letter is displayed, press the fire button and continue for the other two boxes. To begin a new game, press the fire button.

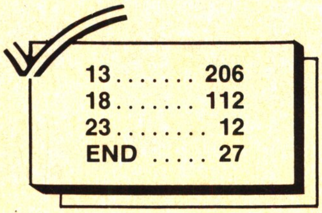
The program is actually in machine language, but you won't need an assembler because the four BASIC listings can by typed in directly.

1) Type in each listing and save it to tape. Don't run them yet. (If you have this month's RAINBOW ON TAPE you can skip this step.)

2) Now *CLOAD* each of the four listings and *RUN* them in turn. Each listing *POKEs* part of the program into memory.

3) Put in a blank tape and enter *CSAVEM "JUNKFOOD",12288,15988,12288.* This will save the machine language program onto your tape. You can now *EXEC* if you would like to play the game.

To load the game tape, just type *CLOADM:EXEC*. The finished game tape will work on a 16K CoCo with or without Extended Color BASIC. Good luck, it takes a big appetite to be a "chompion!"



13 206
18 112
23 12
END 27

Listing 1:

```
1 '*****************************
2 '          JUNKFOOD
3 '        COPR. (C) 1984
4 '        BY DAVID TAYLOR
5 '*****************************
6 'PART#1 : RUN AND LOAD PART#2
7 '*****************************
8 FORX=12288TO13295:READ Z:POKEX
,Z:NEXT
9 DATA15,113,204,128,192,221,114
,126,56,183,16,142,128,128,142,1
0,0,16,175,129,140,34,0,38,248,7
9,183,255,199,183,255,195,183,25
5,197,134,5,180,255,34,183,255,3
4,142,10,44,16,142
10 DATA59,92,189,57,74,48,136,24
,140,11,140,38,241,204,60,158,25
3,61,86,134,2,183,61,85,189,52,1
97,124,61,85,189,52,197,142,11,1
60,204,48,48,237,129,237,129,237
,132,48,136,28
11 DATA140,13,0,38,239,142,61,53
,16,142,62,148,16,191,59,201,236
,129,237,161,140,61,85,38,247,20
4,22,62,253,59,210,204,60,28,253
,59,213,204,60,201,253,60,110,20
4,60,209,253,60
12 DATA108,204,60,223,253,60,66,
204,3,33,253,60,104,204,128,128,
253,59,215,253,59,217,253,59,219
,127,59,207,127,59,238,134,48,18
3,59,205,127,61,88,189,53,112,18
9,56,32,126,51,60
13 DATA173,159,160,10,190,59,210
,166,137,1,0,129,202,38,2,134,12
8,230,137,1,160,193,181,38,2,198
,128,193,202,38,2,198,128,16,131
,128,128,39,3,253,59,215,166,137
,1,128,230,137
14 DATA1,96,16,131,128,128,39,3,
253,59,219,166,137,1,32,230,137,
1,64,16,131,128,128,39,3,253,59,
217,182,1,91,129,6,37,50,129,57,
46,92,252,61,91,195,0,1,253,61,9
1
15 DATA16,131,3,192,16,39,4,176,
16,190,59,210,142,62,117,166,169
,1,32,230,169,1,64,237,132,166,1
69,1,96,230,169,1,128,237,2,32,8
9,204,0,0,253,61,91,252,11,163,2
53,59
16 DATA239,16,190,59,210,16,140,
12,94,39,67,49,168,224,142,62,11
7,204,128,128,237,132,166,169,1,
96,230,169,1,128,237,2,126,49,15
8,204,0,0,253,61,91,252,11,163,2
53,59,239,16
17 DATA190,59,210,16,140,31,222,
39,21,49,168,32,142,62,117,166,1
69,1,32,230,169,1,64,237,132,204
,128,128,237,2,189,49,164,126,49
,216,16,191,59,210,190,59,213,13
4,19,183,59,212
18 DATA236,129,237,164,49,168,32
,122,59,212,46,244,16,190,59,210
,142,62,117,236,132,167,169,1,32
,231,169,1,64,236,2,167,169,1,96
,231,169,1,128,57,182,59,207,129
,21,39,19,124
19 DATA59,207,129,0,39,31,129,10
,16,39,0,12,189,54,166,126,50,22
3,127,59,207,126,50,223,204,60,2
8,253,59,213,16,190,59,210,126,4
9,164,204,60,148,253,59,213,16,1
90,59,210,189
20 DATA49,164,134,1,183,59,238,1
26,53,24,127,59,238,134,3,183,59
```

```
,237,16,142,59,215,236,161,132,1
43,129,128,38,14,196,143,193,128
,38,8,122,59,237,46,237,126,50,2
04,189,54,154,134
21 DATA3,183,59,237,16,142,59,21
5,236,161,132,240,129,128,38,14,
196,240,193,128,38,8,122,59,237,
46,237,126,50,237,204,48,48,253,
62,127,253,62,129,204,49,48,253,
62,131,189,50,115
22 DATA126,50,204,142,11,160,16,
142,62,121,189,50,224,127,59,206
,49,37,142,62,132,166,164,171,13
2,187,59,206,127,59,206,128,48,1
29,57,46,14,167,164,16,140,62,12
1,39,17,49,63,48
23 DATA31,32,226,128,10,167,164,
134,1,183,59,206,32,233,142,62,1
21,16,142,11,160,141,41,49,168,3
2,16,140,12,224,38,245,182,11,16
1,177,59,205,39,3,126,55,204,57,
16,190,59,210
24 DATA204,128,128,253,59,215,25
3,59,217,253,59,219,126,49,164,5
7,236,132,237,164,236,2,237,34,2
36,4,237,36,57,204,48,48,253,62,
127,253,62,131,204,48,49,253,62,
129,189,50,115,32
25 DATA203,204,62,139,253,59,233
```

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,134,9,183,59,230,190,59,221,16,
190,59,233,48,30,134,15,183,59,2
29,236,132,237,1,48,30,122,59,22
9,46,245,166,160,167,2,122,59,23
0,46,229,57,204
26 DATA0,0,195,0,1,16,179,60,104
,38,247,57,204,33,158,253,59,221
,189,51,1,189,48,192,246,61,85,1
6,39,1,195,189,53,24,189,52,112,
189,51,243,182,61,88,16,46,3,191
,189
27 DATA51,47,189,48,192,246,61,8
5,16,39,1,166,189,53,24,189,48,1
92,246,61,85,16,39,1,153,189,53,
24,252,59,221,131,6,128,16,131,7
,158,39,8,16,131,10,222,39,174,3
2,175
28 DATA204,30,94,32,170,190,61,5
1,166,128,167,159,60,110,140,62,
212,39,35,191,61,51,129,1,39,53,
129,2,39,54,129,3,39,55,129,4,39
,56,204,60,235,237,159,60,108,19
5,0,3
29 DATA237,159,60,66,32,68,190,6
0,104,140,0,1,39,6,48,136,236,19
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,62,180,32,196,204,61,15,32,213,
204,60,68,32,208,204,60,112,32,2
03,204,60
```

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Rom-Pak design allows use of disk system while Master Key is installed.
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You can leave the MASTER KEY plugged in all of the time. The gold contacts will improve the I/O of your disk drive, and at the flip of a switch you'll have a quality disassembler. The Examine/Change feature will allow the entry of short M/L routines, and the Screen command will allow quick debugging of graphic screens.

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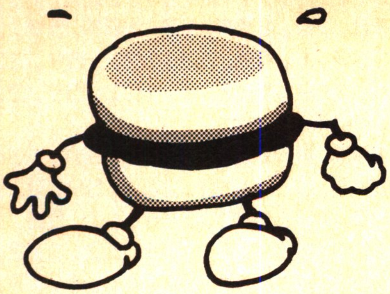

17 72
END 29

Listing 2:

```
1 '******************************
2 '          JUNKFOOD
3 '       COPR. (C) 1984
4 '       BY DAVID TAYLOR
5 '******************************
6 'PART#2 :RUN AND LOAD PART#3
7 '******************************
8 FORX=13296TO14255:READ Z:POKEX
,Z:NEXT
9 DATA112,32,198,108,159,60,106,
166,159,60,106,129,4,39,150,37,7
2,129,7,37,5,79,167,159,60,106,1
66,159,60,110,129,4,39,75,134,9,
16,190,59,233,49,40,174,159,60,6
6,230,132
10 DATA231,164,48,4,49,63,74,46,
245,236,159,60,66,16,163,159,60,
108,39,9,131,0,1,237,159,60,66,3
2,11,236,159,60,108,195,0,3,237,
159,60,66,57,16,190,59,233,49,40
,198
11 DATA128,231,164,49,63,16,188,
59,233,45,237,32,244,134,9,16,19
0,59,233,49,40,198,128,231,164,4
9,63,74,46,247,32,185,190,60,106
,140,60,199,39,7,48,1,191,60,106
,32,6,142
12 DATA60,193,191,60,106,190,60,
110,140,60,206,39,7,48,1,191,60,
110,32,6,142,60,200,191,60,110,1
90,60,108,140,60,219,39,7,48,2,1
91,60,108,32,6,142,60,207,191,60
,108,190
13 DATA60,66,140,60,233,39,7,48,
2,191,60,66,32,6,142,60,221,191,
60,66,57,246,61,85,90,88,79,195,
10,30,31,2,190,61,86,134,10,183,
59,212,236,129,237,164,49,168,32
,122
14 DATA59,212,46,244,57,204,10,0
,253,61,86,246,61,85,193,1,39,9,
189,52,197,204,60,158,253,61,86,
122,61,85,141,112,246,61,85,39,6
,189,55,152,189,56,32,16,142,12,
94,126
15 DATA50,204,189,59,79,126,57,2
4,134,3,183,59,237,16,142,59,215
,236,161,132,240,129,224,16,39,1
,39,196,240,193,224,16,39,1,31,1
22,59,237,46,233,182,59,238,129,
1,16,39,252
16 DATA217,57,190,61,89,166,132,
129,3,37,14,129,4,38,14,246,61,8
8,193,1,37,7,124,61,88,198,5,231
,132,48,1,140,62,212,39,4,191,61
,89,57,142,62,180,124,61,88,32,2
44
17 DATA16,142,128,128,142,12,254
,16,175,129,140,34,0,38,248,16,1
91,12,158,16,191,12,190,16,191,1
2,222,204,3,33,253,60,104,204,0,
0,253,61,91,127,61,88,142,60,186
,16,142,60
18 DATA193,166,128,167,160,16,14
0,60,200,38,246,142,62,148,16,14
2,62,180,16,191,61,89,236,129,23
7,161,140,62,180,38,247,204,128,
128,253,62,117,253,62,119,253,62
,139,253,62,141,253,62
19 DATA143,253,62,145,183,62,147
,57,252,59,239,16,179,11,163,39,
15,204,0,0,253,61,91,252,11,163,
253,59,239,126,49,40,204,60,28,2
53,59,213,16,190,59,210,189,49,1
64,204,9,192
20 DATA142,59,210,16,163,132,35,
56,131,1,128,31,1,16,131,10,192,
39,54,16,142,61,93,236,164,237,1
32,236,34,237,2,49,36,48,136,32,
16,140,61,121,38,237,48,136,132,
95,134,159
21 DATA167,128,92,193,27,38,249,
189,56,2,189,59,79,126,52,229,19
5,3,64,16,131,36,0,38,186,204,0,
0,253,61,91,126,49,40,142,16,1,1
27,59,209,16,142,61,121,127,59,2
08,236
22 DATA161,195,96,96,237,129,124
,59,208,182,59,208,129,14,38,239
,124,59,209,246,59,209,193,12,38
,16,16,140,62,117,39,17,127,59,2
08,127,59,209,48,4,32,213,49,168
,228,48,4,32
23 DATA203,189,55,243,189,59,79,
126,52,229,204,0,184,253,62,136,
142,59,245,191,59,199,190,59,199
,182,255,35,138,8,183,255,35,230
,128,39,9,247,62,133,189,54,191,
191,59,199,57,52
24 DATA80,206,62,133,142,59,243,
191,59,241,174,67,166,159,59,241
```

```
,39,73,198,255,61,132,252,186,25
5,32,183,255,32,230,196,48,31,38
,12,16,190,59,241,49,33,16,191,5
9,241,174,67,90
25 DATA38,237,126,54,245,126,54,
248,126,54,251,18,198,3,244,255,
32,247,255,32,230,196,48,31,38,1
2,16,190,59,241,49,33,16,191,59,
241,174,67,90,38,237,32,177,53,8
0,57,129,3
26 DATA16,38,252,59,204,32,0,253
,62,136,142,60,17,191,59,199,134
,20,183,59,204,142,59,154,16,142
,11,170,189,50,224,48,12,49,38,1
89,50,224,48,20,49,168,26,16,140
,13,10,38
27 DATA235,189,54,166,142,59,160
,16,142,11,170,189,50,224,48,6,4
9,38,189,50,224,48,26,49,168,26,
16,140,13,10,38,235,189,54,166,1
22,59,204,46,189,204,48,48,253,6
2,127,253,62
28 DATA131,204,49,48,253,62,129,
189,50,115,189,53,112,141,36,189
,56,132,189,56,132,126,51,95,142
,60,193,246,255,0,193,126,39,13,
193,254,39,9,48,1,140,60,200,39,
235,32,236,191
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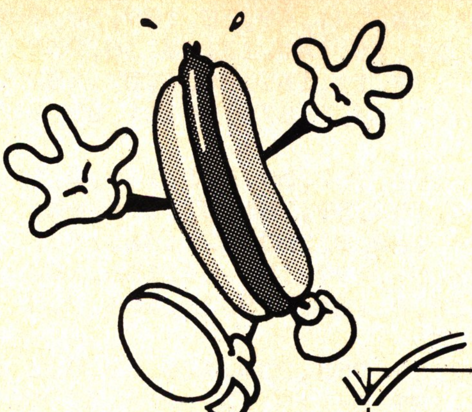

17 80
END 29

Listing 3:

```
1 '*****************************
2 '          JUNKFOOD
3 '       COPR. (C) 1984
4 '       BY DAVID TAYLOR
5 '*****************************
6 'PART#3 : RUN AND LOAD PART#4
7 '*****************************
8 FORX=14256TO15215:READ Z:POKEX
,Z:NEXT
9 DATA60,106,57,142,10,0,16,142,
```

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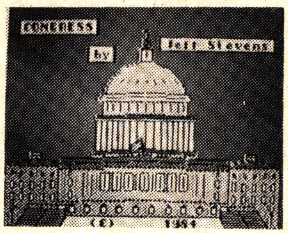
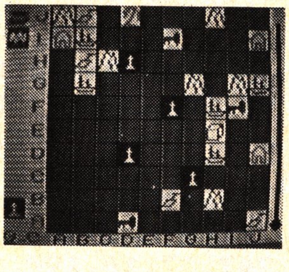
CONGRESS

An award winning political simulation by Jeff Stevens. Have you ever wondered what it feels like to be the President of the United States? Congress lets you be the President. You select a program to get through Congress. You decide which states to influence through pork-barrel legislation. You assign lobbyists to the House or Senate, and you determine how to use log rolling favors. Finally, you decide whether to sign a bill into law or veto it. Your overall performance is rated in comparison to the popularity of other presidents. "Congress" also serves as a fine tutorial on how a bill becomes a law. It will add a spark to any government class. All would-be politicians will enjoy it.

Grades 7-12 and Adult
32K Cass. - $29.95
32K Disk - $31.95



RECESS GAMES



A superb Christmas gift! Four Games in one program provide an enjoyable format for using higher level thinking skills. Players must reason logically while playing Treasure Hunt, Masterbrain, Tic Tac Toe, and Number Guess. Children use co-ordinates and a hot/cold thermometer to find a treasure hidden behind a grid. Number Guess includes an optional use of a number line to help children approximate answers. In Masterbrain, players must consider the many possible ways to arrange specific digits to build numbers. Tic Tac Toe encourages children to predict and plan sequential moves. All games are multi-leveled so children of different ages can play the same game. One and two player options — Large graphic numerals — Attractive Screen Displays.

Grades 2-8
16K Cass.(2) - $19.95
32K Disk - $21.95

SPELLING

Add zest to the basics! **Spelling** allows you to input your own words and save them on data files (tape or disk). You may also purchase ready made data files (below). During the lesson a word flashes on the screen, and the student then types the word. If the word is misspelled, the correct spelling appears and aligns itself underneath the misspelling. The student can quickly determine the error and correct it. The score is given continuously, and all misspelled words are given at the end. A graphic display of superlative words and song provide a reward. Printer use is optional. **Spelling** will accept words with apostrophes, hyphens, and spaces. Word lists may be easily edited.

Grades 2-8.
16K Cass. - $19.95
32K Disk - $21.95

Data Files
Dolch Words
Most Misspelled
Space Words
Grades 2, 3, 4, 5, or 6
$8.95 each - Cass.
$10.95 each - Disk

```
11,170,189,50,224,49,38,189,50,2
24,49,168,26,16,140,13,10,38,239
,57,68,72,177,11,161,39,1,57,182
,61,85,129,7,38,1,57,124,61,85,1
89
10 DATA52,197,182,59,205,139,2,1
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,16,142,8,32,189,50,224,16,142,1
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10,0,38
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,237,129,32,244,57,142,8,32,16,1
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20 DATA59,190,189,58,62,16,142,5
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22 DATA57,229,166,164,129,90,39,
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,57,10,21,14,11,6,15,15,4,128,0,
67,79,80,82,110,96,113,121,120,1
16
```

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Eight 200 NS Factory Prime 64K RAM Chips. Allows you to upgrade 'all' board easily. No soldering needed. $52.50

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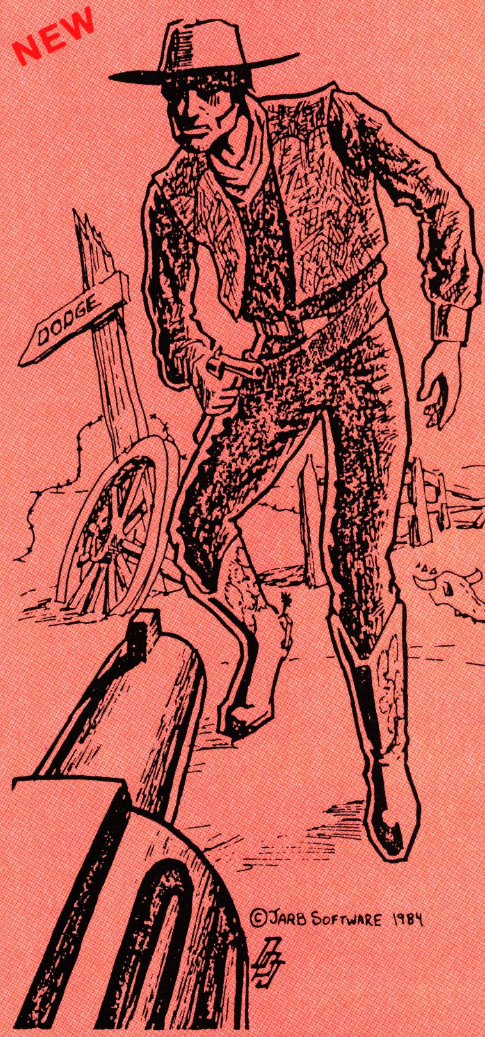
NOT FOR CoCo 2



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BY Terry A. Steen

An excellent hi-res, arcade quality game program for two players. Joysticks and 32K are required in this all machine language program.

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(by Bill Cook)

For 32K EXT	$19.95
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The program allows the user to build a dictionary of words. During testing, the words are spoken. If an incorrect response is given, the word is spoken again and spelled. Tape (32K EXT) $22.95

TALKING SCORE E-Z

A yahtzee type program. Up to six players can compete. All scoring and record keeping is done by the computer. Tape (32K EXT) $19.95

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The perfect educational game to aid the student in learning addition, subtraction, multiplication and division. Allows one to specify difficulty level.

Tape (32K EXT) $22.95

TALKING SHIP HUNT

by Cobra Software

Play Battleship against your computer. 32K w/ joystick needed. Graphics and sound. Can be played without voice.

Cassette $10.95

SCHEMATIC DRAFTING PROCESSOR (disk) can draw large scale schematics in hi-res (has six overlapping screens) and then print them out to any of several popular printers, fast!! A must for serious hardware computerist.

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PRO-COLOR-SERIES

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NOBODY, BUT NOBODY HAS DONE IT LONGER AND BETTER THAN US!

A fully intergrated series of programs that offers a full range of information tracking capability.

PRO-COLOR-FILE *Enhanced* $79.95

This is the main link in the series. With PRO-COLOR-FILE, you can design a full featured database that is custom tailored to your needs. Its ability to allow the user to custom define formats is unmatched by anything else on the market. A full range of features for information handling is available for any application you might have:

* *60 Data Fields for storing data*
* *1020 bytes capacity per record*
* *Variable record length capability*
* *Multi-drive drive ability*
* *Allows maximum system storage*
* *4 Custom designed screen formats*
* *28 Equation lines (+ − * /)*
* *8 Custom designed report formats*
* *Send reports to printer or screen*
* *Summarize file by groups of records*
* *Column totals and averages*
* *Posting routine performs file wide calculations and updates fields*
* *6 Custom designed mailing label formats*
* *Custom designed menus for selection of reports and label formats*
* *Selectable password protection for data entry screens and reports*
* *Sort any size file*
* *3 level sort capability*
* *Select options for sorting or reporting sub-sets of a file*
* *Duplicate records and fields*
* *Cursor controlled text editing*
* *Fast record selection via indexing*
* *Global file searching*

As a database is created, all of the formats are stored in a file which means you won't have to enter it each time you want to print a report or label. Once your database is up and running, you can install a limited menu that will lead even the most timid user through the program. Since menu selection of report formats are custom made, you'll know exactly which format does what.

PRO-COLOR-FILE is also supported by a NATIONAL USERS' group. Their quarterly newsletter is packed with ideas for using PRO-COLOR-FILE to its fullest. A listing of database programs that have already been created is also provided for comparing notes with other users. Useful database information such as magazine articles are available on a data disk for use on your own system.

Think about it, how can a program exist for over a year and a half, be sold in every state and overseas, and have the support of a national users' group? Simple, it's that good!

PRO-COLOR-FORMS** $39.95

This is the second link in the series. PRO-COLOR-FORMS offers the ability to merge data files with text files. Just imagine being able to place the data you enter with PRO-COLOR-FILE anywhere on a sheet of paper, either by itself or within an external source of text, then you'll have the picture. This means you could write a general letter to a list of people but have each one custom printed with their name and address. You can pre-enter checks into a data base and then have the checks printed on form-feed checks. You might even use form-feed statements for sending out to customers at the end of each month. All of the parameters can be modified to indicate just what size "page" you need for any application:

* *6 Menu Selectable formats*
* *Page width from 40 to 133 characters*
* *Lines per page from 7 to 66*
* *Supports printer control codes*
* *Converts any ASCII file for use*
* *Prints multiple copies*
* *Interfaces with PRO-COLOR-FILE*
* *Password protection*

If you need to generate forms from your data files then chances are you can do just that with PRO-COLOR-FORMS. Form letters, billing statements, index cards, or even post cards can be used easily.

PRO-COLOR-DIR** $24.95

The latest addition to the series is a utility for organizing disk directories into one nice listing. PRO-COLOR-DIR reads the directory of a diskette and then stores valuable information about each program into a master data file. This data file can then be accessed by PRO-COLOR-FILE for sorting, searching and reporting. PRO-COLOR-DIR will create a record for each filename on a diskette and store the following information about each one:

* *Diskette ID name*
* *Date diskette was created*
* *Last date diskette was updated*
* *Filename and extension*
* *File type (BASIC, ML, Text, Data)*
* *Number of Grans allocated*
* *Number of sectors allocated and used*
* *Machine Language program addresses*

PRO-COLOR-DIR allows for hardcopies of a single diskette's files and has a versatile label printing routine. A global replace function can re-store a diskette's files with deleted files being removed or new ones appended automatically.

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PRO-COLOR-FORMS & PRO-COLOR-DIR Require PRO-COLOR-FILE to be used

Requires 32K Disk Basic

DERRINGER SOFTWARE CELEBRATES 2nd ANNIVERSARY

ANNIVERSARY SPECIAL

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PRO-COLOR-FILE *Enhanced*	$59.95	*Save $20*
PRO-COLOR-FORMS	$29.95	*Save $10*
PRO-COLOR-DIR	$19.95	*Save $5*
ALL THREE	$99.95	*Save $44*

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Note: All of our programs have registration cards - If you've purchased one from another dealer, then you should be registered with us. If not, send your name, program ID# and where the program was purchased. We want to keep you informed about changes.

18 246
END 123

Listing 4:

```
1 '*****************************
2 '          JUNKFOOD
3 '       COPR. (C) 1984
4 '       BY DAVID TAYLOR
5 '*****************************
6 'PART#4 : RUN AND EXEC12288
7 '*****************************
8 'OR, BEFORE 'EXEC'ING : CSAVEM
"JUNKFOOD",12288,15988,12288
9 '*****************************
10 FORX=15216TO15989:READ Z:POKE
X,Z:NEXT
11 DATA128,0,66,89,128,0,68,65,8
6,73,68,96,84,65,89,76,79,82,128
,0,14,5,23,32,8,9,7,8,32,19,3,15
,18,5,128,0,175,175,175,175,128,
0,66,79,78,85,83,32
12 DATA2,15,14,21,19,32,58,32,49
,48,48,48,48,48,48,48,48,48,48,4
8,48,48,48,48,48,48,48,48,48,48,
32,32,32,32,32,32,32,32,32,0,0,0
,0,0,0,0,0,0
13 DATA0,0,0,0,0,0,0,128,128,128
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2,31,42,28,38,0,255,0,64,58,64
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19 DATA224,224,224,224,234,224,2
34,229,234,224,239,239,229,229,2
29,229,234,239,234,224,229,239,2
24,224,224,224,224,224,224,224,2
24,176,176,176,176,176,176,176,1
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86,191
20 DATA159,159,191,181,159,159,1
86,176,159,159,176,176,149,154,1
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38,128,128,128,135,136,133,138,1
28,128,128,133,138,133,138,128,1
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24 DATA135,136,133,138,128,128,1
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38,133,143,143,143,143,136,128,1
33,143,143,143,143,136,128,133,1
38,128,128,128,141,130,133,138,1
28,128
25 DATA128,133,138,133,138,128,1
28,133,138,128,133,138,128,128,1
28,128,128,133,138,128,128,128,1
33,138,133,138,128,128,128,133,1
38,133,138,128,128,128,143,128,1
33,138,128,128,128,128,128,133,1
39,131
26 DATA131,131,143,136,128,141,1
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28,128,133,138,133,138,128,128,1
28,128,128,132,140,140,140,140,1
36,128,128,128,140,140,140,128,1
28,132,136,128,128,128,132,136,1
32,136
27 DATA128,128,128,128,128
```

DISK UTILITY

32K
Disk

This is the first in a three-part series on diskette file organization

The Diskette Directories Handler System

By Marvin E. Swan

As your disk system grows, it becomes impossible to keep control of every program and file. Why not let your CoCo keep track of this information for you? Let it look at its own programs and files, gather its own information about itself then report to you what it has found.

The *Diskette Directories Handler* is the answer to an easy and efficient way to organize diskette files for your CoCo. The *Handler* system consists of three integrated BASIC programs that generate all your diskette directories information into seven comprehensive reports, plus one quick documentation print-out program. The *Handler* system requires 32K, Extended Disk BASIC, a disk drive, cassette tape recorder and printer. Each presented screen is "mapped out" in an attractive format rather than the conventional screen scroller.

The *Handler* system creates diskette gum labels and jacket labels for every diskette in your library, as well as creates a master catalog of all your diskettes. It extracts directory information and produces a load report, diskette names and usage report, and a directory consolidation report so you can find what you want in seconds. You will see at a glance, all your machine language RAM addresses, multiple cataloged programs/data files and it lets you know of any programs with the same name that are of a different byte size. The *Handler* system shows how many bytes are still available on each diskette and which diskette has the most space.

The *Handler* system is genuinely self-prompting and user friendly. Here is a

(Marvin E. Swan is an employee of Paccar, Inc., manufacturers of Kenworth trucks, Peterbilt trucks and railroad cars. He is a data processing systems analyst at a centralized computer facility with experience on IBM mainframes and minis. He and his wife, Lajuanna, have two sons in college.)

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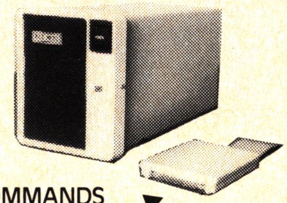

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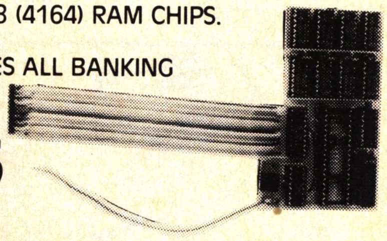

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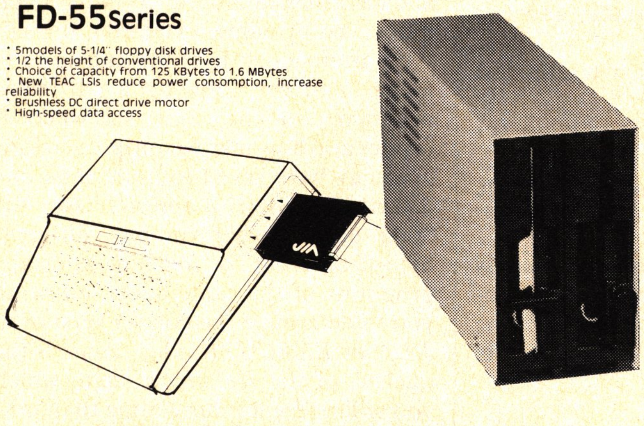

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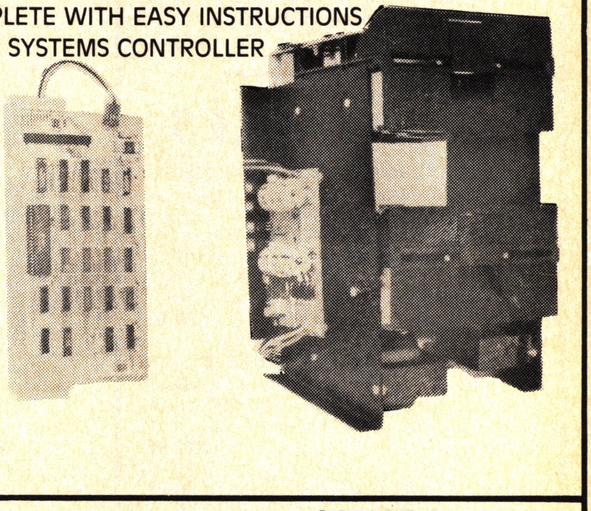

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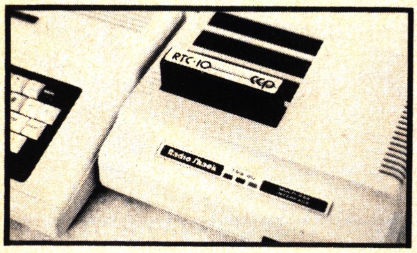

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cross reference of all programs and reports and their *RUN* sequence:

PROG. NAME	OPTIONAL REPORT?	REPORT TITLE	SEQUENCED BY
DIR0	no	DOCUMENTATION	
DIR1	yes	#1 EXTR. & LOAD DIR.	your own diskette filing
DIR1	yes	#2 DISKETTE NAMES	diskette name
DIR1	yes	#3 DISKETTE USAGE	number of bytes used
DIR1	yes	#4 DISK JACKET LABELS	your own diskette filing
DIR2	yes	#5 DISK LABELS (gum)	your own diskette filing
DIR3	no	#6 CONSOLIDATION	prog/size/diskette name
DIR3	no	#7 SUMMARY (stats)	

Extract And Load Directories, Report #1

This report is generated by program *DIR1*. The purpose of report #1 is to show detailed catalog information about each diskette in your system. The report is in sequence by your own filing system, in other words, in order by which you insert them into your disk drive. Programs and files are listed as they are encountered in the directory. Report numbers one through four are generated by program *DIR1*. Each printed diskette shows:

- Diskette name
- Programs, files, extension, type and format
  - First granule, first track and first sector
  - Last granule, last track, and last sector
  - Number of sectors/bytes on last track/sector
- Total granules used/available for diskette
- Total bytes used/available for diskette

Diskette Names, Report #2

The purpose of this report is to show general diskette information. No programs or data files are shown. The report is in sequence by diskette name. Each printed line shows:

- Diskette name
- Total number of programs and data files
- Total number of bytes/granules in use and available
- Statistical total line

Diskette Usage, Report #3

This report shows diskette usage of all your diskettes. This report is exactly like Diskette Names except it is in sequence by number of available granules and bytes per diskette, which allows you to see which diskette contains the most available space.

Diskette Jacket Labels, Report #4

Report #4 gives you the ability to see each diskette directory as you manually flip through your diskette file box. The report prints three directories per page with dotted lines available for cutting, and placing each directory in front of or inserting into each diskette jacket.

Diskette Gum Labels, Report #5

This report is generated by program *DIR2*. This report prints diskette names onto gum labels for attachment to your diskettes for easy identification. Two sizes are available: $3\frac{1}{2}$ x $^{15}/_{16}$ inches and 4 x $1^{15}/_{16}$ inches.

Consolidated Directories, Report #6

This report is generated by program *DIR3*. Report #6 shows all programs and data files cataloged to your system, sequenced by name, extension, format, type, granule size, byte size and diskette name. You can look up a particular program/data file name, see where it resides and how many multiple versions you may have saved to more than one diskette. An asterisk appears under the "flag" column when you have different byte-sized BASIC or machine language programs of the same name, allowing you to determine the correct version to *RUN* or *EXECUTE*. This report is the nucleus of the *Handler* system, which you will reference more often than others. You can cross reference all programs/data files in your CoCo, giving you the ability to purge and manage your entire diskette library.

Disks Directory Summary, Report #7

Generated by program *DIR3*, report #7 shows statistical and percentage totals of all your diskettes, granules, bytes, programs and data files in your system. The following statistics and percentages will print:

Total diskettes

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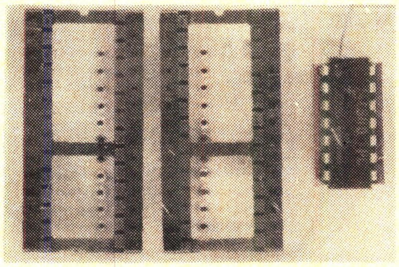

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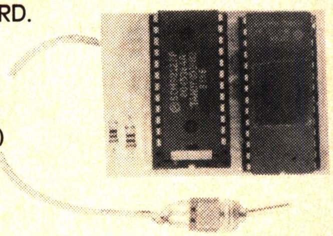

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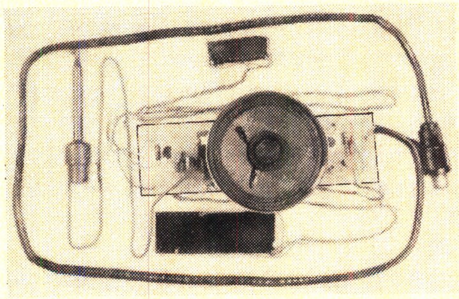

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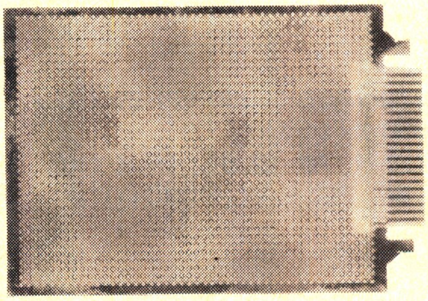

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Bytes/granules used, not used, final total
  * (Note that percentage between granules and bytes do not match because granules are in increments of 2,304 bytes each and bytes are absolute.)
Total BASIC, assembly and machine language programs
Total data files
Total multiple program versions with different byte size
Total diskettes with disk read errors encountered
Total reports you requested from *Handler* system

Program *DIR1*

The purpose of *DIR1* is to extract diskette directory information from all your diskettes and load to a catalog file, and print numbers one through four. *DIR1* asks you to insert all your diskettes into drive 0, one at a time, and asks for a descriptive name of each diskette. All information is placed on cassette tape to free up the disk drive. When you run out of diskettes, *DIR1* transfers the catalog file from tape to the *Handler* diskette. If you encounter a disk read error on one of your diskettes, the screen instructs you to type *GOTO5000* and press ENTER. This will keep you from having to start all over again. Do not insert OS-9 or any foreign diskettes or you will get an FC or BS Error due to incompatible directory format. However, don't worry, just *GOTO5000*. Disk read errors, FC and BS Errors will be noted on all reports as a disk read error but will produce slightly inaccurate statistical information. When an error like this occurs, all statistical accumulaters are zeroed out for that particular diskette and any directory information already extracted for that diskette has already been written out to the catalog file on cassette tape. Therefore, final totals will not exactly match the number of programs and files printed. This is a very slight discrepancy and is not a problem. When *DIR1* is complete, it will automatically *RUN DIR2* or *DIR3*, based on what reports you originally requested. I recommend compressing *DIR1* to help it run more efficiently. The following BASIC line numbers contain Epson printer codes that you may change to satisfy your printer requirements: 0820, 0830, 2680 and 3790.

A Continuing Saga

Next month, Part 2 will explain program *DIR2*, which generates Diskette Gum Labels, Report #5. The following month we will present Part 3 and the final program *DIR3*, which generates Consolidated Directories, Report #6 (the most important and useful of all seven reports), and Disks Directory Summary, Report #7. Also included will be program *DIR0*, which prints a quick explanation of the *Handler* system for when you can't find your RAINBOW for reference.

180	68	2370	98
320	218	2560	161
510	38	2740	44
600	179	2930	61
710	247	3090	211
860	47	3310	180
1060	49	3420	252
1280	209	3600	44
1460	231	3800	130
1690	228	4020	105
1920	60	4250	23
2130	171	END	118

The listing:

```
10 CLS:PRINT
20 VERIFYON:P=1
30 XP=INT((256*PEEK(25)+PEEK(26)
-256*PEEK(188))/1536)
40 IF P=XP THEN 70 ELSE IF P<XP
THEN 5100 ELSE PCLEAR P:GOTO70
50 '
60 '
70 '[DIR1]
80 'DISKETTE DIRECTORIES HANDLER
90 'PROGRAM 1 OF 3
100 'COPYRIGHT 1984 BY MARV SWAN
110 '
120 'H O U S E K E E P I N G
130 '
140 D1$=CHR$(77)+CHR$(65)+CHR$(8
2)+CHR$(86)+CHR$(39)+CHR$(83)+CH
R$(32)+CHR$(67)+CHR$(79)+CHR$(77
)+CHR$(80)+CHR$(85)+CHR$(84)+CHR
$(69)+CHR$(82)+CHR$(32)+CHR$(82)
+CHR$(79)+CHR$(79)+CHR$(77):D2=7
0:D4=50
150 D2$=CHR$(80)+CHR$(82)+CHR$(6
9)+CHR$(83)+CHR$(69)+CHR$(78)+CH
R$(84)+CHR$(83):D3=140
160 CLS:PRINT@D2,D1$:PRINT@D3,D2
$:X=X+1:IFX<D4 GOTO160
170 IFX=0THENNEWELSECLS:CLEAR500
0
180 R6$="X":I$=CHR$(128):E2$="er
ror"+I$+STRING$(8,CHR$(126))+I$+
"no"+I$+"commas"+I$+"allowed":E1
$="error"+I$+STRING$(2,CHR$(126)
)+I$+"must"+I$+"be"+I$+"one"+CHR
$(124)+"twenty"+I$+"char"
190 E0$="are"+I$+"you"+I$+"sure"
+I$+STRING$(19,CHR$(127)):E4$="t
ype"+I$+"n"+I$+"for"+I$+"no"+I$+
"or"+I$+"enter"+I$+"for"+I$+"yes
"+I$+CHR$(127)
200 DIM GR(68)   'GRANS
210 DIM DN$(125):DIM FU(125):DIM
 BU(125):DIM BA(125):DIM GU(125)
:DIM GA(125):DIM FE(125)   'DISKE
TTE TABLE
220 FT$(0)="B":FT$(1)="D"   'FILE
 TYPE
230 FT$(2)="M":FT$(3)="A"
240 DIM TFT(3)   'FILE TYPE TOTAL
S
250 '
260 GOSUB4340:PRINT@128," turn Y
```

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Dolan	188	157	103	112	161	122	99	145	145	103					188	97
Feagan	105	94	127	115	157	97	61	132	113						174	61
Graham	135	135	183	116	151	104	86	149							183	63
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Latour	112	128	124	129												
Lucido	158	110														
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Taylor														145	190	88
Torres					131								1620	135	177	105
Turner				127	131						75	178	1635	136	190	75
Wehlen			145	142	154			137	125	106	60	151	1495	125	154	60
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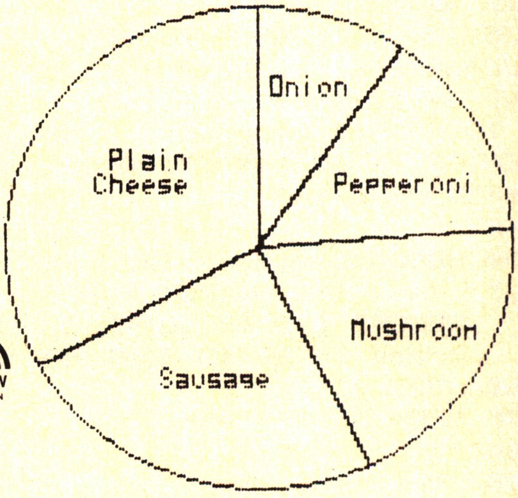

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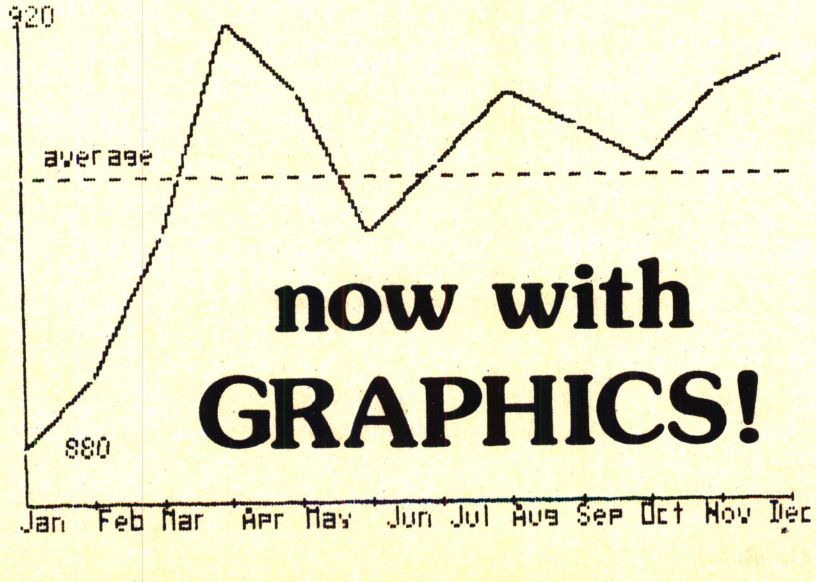

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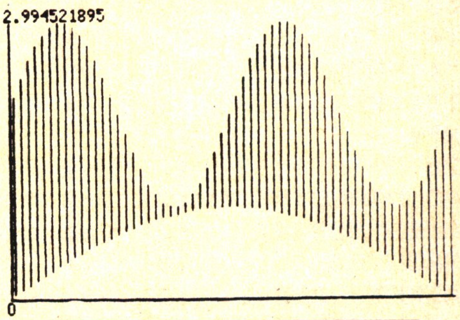

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```
OUR VOLUME UP":FORX=1TO70:SOUND1
0,1:NEXTX
270 '
280 GOSUB4340:SOUND10,3:PRINT@14
7,"  ........":PRINT@128,"";:INPU
T" type CURRENT DATE";DATE$
290 IFLEN(DATE$)<5 OR LEN(DATE$)
>8 GOTO280
300 '
310 GOSUB4340:SOUND10,3:PRINT@12
8," type DESIRED WORK FILE NAME
    1-8 CHARACTERS/NO EXTENSION"
320 PRINT"    ........":PRINT@193
,"";:INPUTFI$
330 IFLEN(FI$)<1 OR LEN(FI$)>8 G
OTO310
340 I=INSTR(FI$,"/"):IFI<>0 GOTO
310
350 I=INSTR(FI$,"."):IFI<>0 GOTO
310
360 FORX=3TO11
370 DSKI$DR,17,X,A$,B$
380 F=INSTR(B$,FI$)
390 IFF>0THENFT=FT+1
400 F=INSTR(A$,FI$)
410 IFF>0THENFT=FT+1
420 NEXT
430 IFFT<>0THENFT=0:SOUND10,3:GO
SUB4340:PRINT@128," '";FI$;"' FO
UND ON DISKETTE":PRINT" press 'R
' TO RETYPE FILE NAME   OR press
 ENTER TO CONTINUE":GOSUB2310:IF
I$="R"GOTO310
440 '
450 GOSUB4340:SOUND10,3:PRINT@12
8," ready THE OUTPUT TAPE, press
    RECORD & PLAY BUTTONS, THEN
    press ENTER TO CONTINUE"
460 GOSUB2310
470 OPEN"O",#-1,FI$
480 '
490 'RPT SELECTN MENU
500 GOSUB4340:SOUND10,3
510 PRINT@64,"REP";:PRINT@96,"NO
.";:PRINT@68,"REQ";:PRINT@100,"R
PT";:PRINT@104,"REPORT DESCRIPTI
ON";
520 PRINT@160,"(1) yes EXTRACT/L
OAD DIRECTORIES(2) yes DISKETTE
NAMES SORTED    (3) yes DISKETTE
USAGE SORTED    (4) yes DISKETTE
JACKET LABELS   (5) yes DISKETTE
GUM LABELS      (6) yes CONSOLIDA
TED DIRECTORIES(7) yes DISKS DIR
ECTORY SUMMARY"
530 PRINT@417,"TAP 1-5 TO CANCEL
/REQUEST FIVE";:PRINT@449,"REPOR
TS, REPORTS 6 THRU 7 WILL";:PRIN
T@481,"ALWAYS PRINT, PRESS E TO
EXIT.";
540 X1=1:X2=1:X3=1:X4=1:X5=1:X6=
1:X7=1
550 GOSUB2310
560 IF I$="1" AND X1=0 THEN X1=1
:PRINT@164,"yes"; ELSE IF I$="1"
 AND X1=1 THEN X1=0:PRINT@164,"n
o ";
570 IF I$="2" AND X2=0 THEN X2=1
:PRINT@196,"yes"; ELSE IF I$="2"
 AND X2=1 THEN X2=0:PRINT@196,"n
o ";
580 IF I$="3" AND X3=0 THEN X3=1
:PRINT@228,"yes"; ELSE IF I$="3"
 AND X3=1 THEN X3=0:PRINT@228,"n
o ";
590 IF I$="4" AND X4=0 THEN X4=1
:PRINT@260,"yes"; ELSE IF I$="4"
 AND X4=1 THEN X4=0:PRINT@260,"n
o ";
600 IF I$="5" AND X5=0 THEN X5=1
:PRINT@292,"yes"; ELSE IF I$="5"
 AND X5=1 THEN X5=0:PRINT@292,"n
o ";
610 IF I$<>"E" THENSOUND10,3:GOT
O550
620 '
630 IFX1=1 OR X2=1 OR X3=1 OR X4
=1 OR X5=1 THENSOUND10,3:GOSUB43
40:PRINT@103," ready THE PRINTER
 ";:PRINT@167," THEN press ENTER
  ";:GOSUB2310
640 '
650 'G E N   O U T P U T   F I L
E   &   P R N T   R P T   # 1
660 '
670 'INSERT DISKETTE
680 IF LK>55 GOSUB2050
690 PREV$=DISK$:PW$=W$
700 SOUND10,3:GOSUB4340:GOSUB440
0:W$=STR$(TTL+1):W$=RIGHT$(W$,LE
N(W$)-1):PRINT"insert DISKETTE #
";W$;" IN DRIVE 0":PRINT@128,"ty
pe 'STOP' IF NO MORE DISKETTES";
:IF PREV$<>"" THEN PRINT@288,"PR
EVIOUS DISKETTE #";PW$;":":PRINT
 PREV$;PERR$
710 PRINT@192,"type DISKETTE NAM
E AND enter:":PRINT@256,E3$;:PRI
NT@224,STRING$(20,"."):PRINT@224
,"";:LINE INPUT DISK$:E3$="":IF
LEN(DISK$)<1 OR LEN(DISK$)>20 TH
EN E3$=E1$:GOTO700 ELSE I=INSTR(
DISK$,","):IF I<>0 THEN E3$=E2$:
GOTO700
720 IF DISK$="STOP" OR DISK$="EN
D" OR DISK$="QUIT" THEN SOUND234
,3:PRINT@96,E0$;E4$;:GOSUB2310:I
FI$="N"GOTO700 ELSE IF TTL>0 GOT
```

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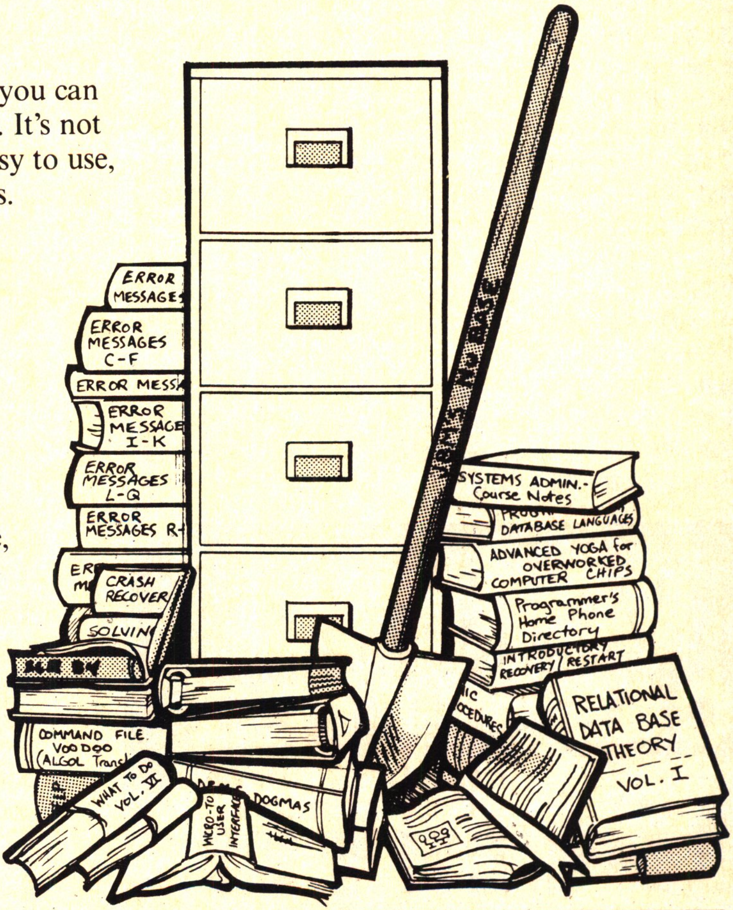
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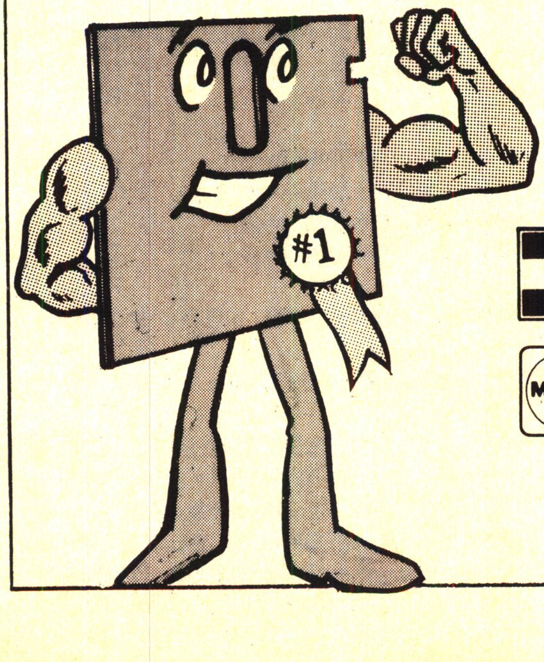

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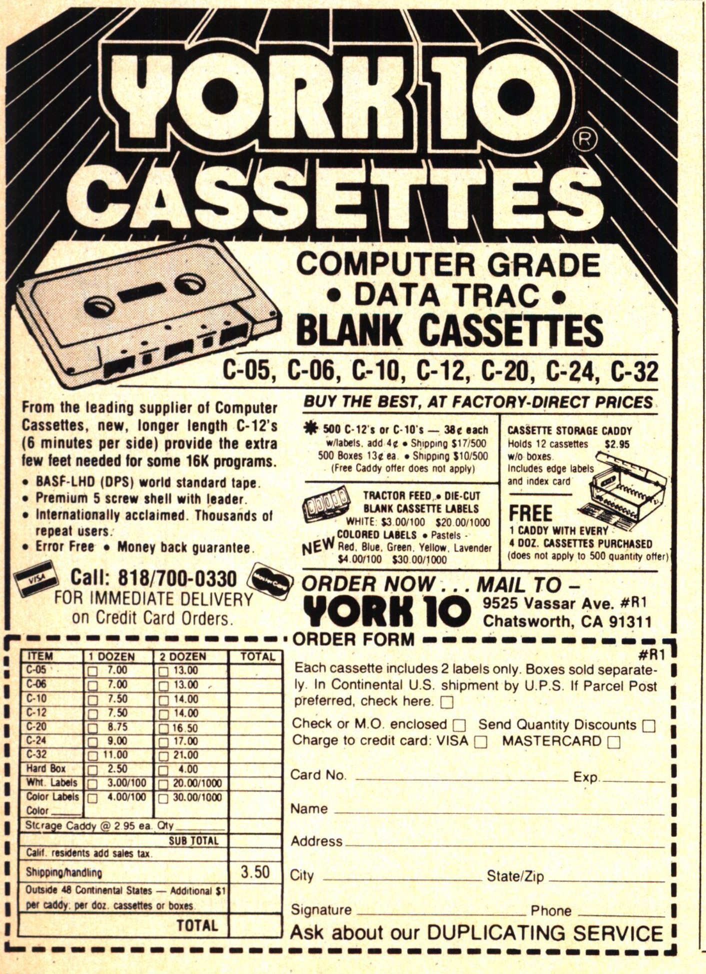
```
02430 ELSE GOSUB4340:END
730 SDISK$=DISK$
740 IF LEN(DISK$)<20 THEN DISK$=
DISK$+" ":GOTO740
750 TTL=TTL+1
760 PRINT@224,SDISK$;STRING$(20-
LEN(SDISK$),".");"<=PROCESSING";
770 PERR$=""
780 IFR6$="X"THENR6$=" "ELSER6$=
"X"
790 '
800 'PRINT HDNG RPT #1
810 IF X1=0 GOTO910
820 IFOF=0THENOF=1:PRINT#-2,TAB(
13);CHR$(14)"extract & load dire
ctories";CHR$(20):PRINT#-2:PRINT
#-2:LK=3
830 PRINT#-2,TAB(8)DATE$;"   DISK
ETTE   ";CHR$(14);SDISK$;CHR$(20)
840 PRINT#-2,TAB(5);:FOR N=1 TO
68:PRINT#-2,"=";:NEXT N
850 PRINT#-2:PRINT#-2,TAB(5)"nam
e"TAB(14)"ext"TAB(18)"1"TAB(20)"
2"TAB(22)"fgn"TAB(27)"ftn"TAB(32
)"fsn";
860 PRINT#-2,TAB(37)"lgn"TAB(42)
"ltn"TAB(46)"nslt"TAB(52)"lsn";
870 PRINT#-2,TAB(56)"nbls"TAB(63
)"ng"TAB(71)"nb"
880 LK=LK+3
890 '
900 'READ DIRECTORIES
910 DSKI$ DR,17,2,G1$,G2$   'GRAN
S
920 FB$=LEFT$(G1$,68)
930 FORI=1TO68:GR(I-1)=ASC(MID$(
FB$,I,1)):NEXT I
940 FOR X=3 TO 11
950 DSKI$ DR,17,X,A$,B$   'DIRECT
ORIES
960 C$=A$+LEFT$(B$,127)   '1ST 8
IN C$
970 AA$=A$+LEFT$(B$,120)
980 FOR N=0 TO 7
990 D$=MID$(C$,N*32+1,32)   '32 C
HUNKS
1000 GR=ASC(MID$(AA$,N*32+14,1))
1010 F1G=GR
1020 FT$=MID$(AA$,N*32+12,1)
1030 IF LEFT$(D$,1)=CHR$(255) GO
TO1240   'DONE
1040 IF LEFT$(D$,1)=CHR$(0) GOTO
1160   'UNUSED
1050 FORI=1TO68
1060 IF GR(GR)<128 THEN GR=GR(GR
):NEXT I
1070 IF ASC(FT$)=2 GOSUB 2090   '
CALC ML ADDR
1080 N$=MID$(D$,1,8):E$=MID$(D$,
9,3)
1090 IF X1 THEN PRINT#-2,TAB(5)N
$;" ";E$;
1100 FOR S=12 TO 16   'NEXT 4 ENT
RIES
1110 F$=MID$(D$,S,1)
1120 F=ASC(F$)
1130 ON S-11 GOSUB1460,1500,1550
,1740
1140 NEXT S
1150 IF ASC(FT$)=2 AND X1=1 GOSU
B2270   'PRINT ML ADDR
1160 NEXT N
1170 NEXT X
1180 IFGU<0 THENGU=0
1190 IFGA<0 THENGA=0
1200 IFBU<0 THENBU=0
1210 IFBA<0 THENBA=0
1220 '
1230 'PRNT DISKETTE TOTALS RPT #
1
1240 IF X1=0 GOTO1380   'NOT REQS
TD
1250 SOUND10,3:CLS:GOSUB4340:PRI
NT"remove '";SDISK$;"' ":PRINT"DI
SKETTE FROM DRIVE 0 AND FILE  IT
 AWAY IN YOUR STORAGE BOX":PRINT
@224,"get ready FOR NEXT DISKETT
E"
```



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```
1260 IF LK>55GOSUB2020
1270 PRINT#-2,TAB(5);:FOR N=1 TO
 68:PRINT#-2,"=";:NEXT N
1280 PRINT#-2
1290 PRINT#-2,TAB(15)"used     no
t used   [granule=2,304 bytes,9
sectors,1/2 trk]"
1300 PRINT#-2,TAB(5);:PRINT#-2,U
SING"%       %###,###       ###,###"
;"grans:",GU,GA;
1310 PRINT#-2,TAB(34)"1=file-typ
e 2=file-format f=frst l=last"
1320 PRINT#-2,TAB(5);:PRINT#-2,U
SING"%       %###,###       ###,###"
;"bytes:",BU,BA;
1330 PRINT#-2,TAB(34)"g=grans t=
track s=sect b=bytes n=number"
1340 PRINT#-2:PRINT#-2
1350 LK=LK+6
1360 '
1370 'STORE DISKETTE TABL
1380 DN$(TTL)=DISK$:FU(TTL)=FU:B
U(TTL)=BU:BA(TTL)=BA:GU(TTL)=GU:
GA(TTL)=GA:FE(TTL)=FE
1390 FU=0:BU=0:BA=0:GU=0:GA=0:FE
=0
1400 '
1410 'INSERT NEXT DISKETTE
1420 GOTO680
1430 '
1440 'G O S U B S :
1450 '
1460 IF F<4 THEN HF=F ELSE HF=1
 'FILE TYPE
1470 IF X1 THEN PRINT#-2," ";FT$
(HF);
1480 RETURN
1490 '
1500 IF F=255 THEN R$="A" ELSE R
$="B"  'FILE FORMAT
1510 IF X1 THEN PRINT#-2," ";R$;
1520 RETURN
1530 '
1540 'GET SECTORS/TRKS/BYTES
1550 FG=F:FT=INT(F/2)  '1ST GRAN
 & TRK
1560 IF FT>=17 THEN FT=FT+1  'AD
J FOR DIR
1570 A=(F AND 1):IF A=0 THEN FS=
1 ELSE FS=10  '1ST SEC
1580 TG=1:GA=F  'GRAN CNTR & GRA
N ADD
1590 GOSUB 1700  'GET NEXT GRAN
1600 IF LG>67 GOTO1620  'LAST GR
AN
1610 TG=TG+1:GA=LG:GOTO1590  'NO
T LAST GRAN
1620 LT=INT(GA/2):IF LT>=17 THEN
 LT=LT+1  'LAST TRK
1630 NS=(LG AND 15)  'SEC LAST G
RAN
1640 A=(GA AND 1):IF A=0 THEN LS
=1 ELSE LS=10  'LAST SEC STRT
1650 LS=LS+NS-1:LG=GA  'LAST GRA
N & SEC NO.
1660 BG=(NS-1)*256  'BYTES LAST
SEC-1
1670 RETURN
1680 '
1690 'NEXT GRAN
1700 N1$=MID$(G1$,GA+1,1)
1710 LG=ASC(N1$):RETURN
1720 '
1730 'PRNT DETAIL LINE RPT #1, C
REATE OUTPUT FILE
1740 S=S+1
1750 F$=MID$(D$,S,1)  'NEED LAST
 BYTE(15) ONLY
1760 LB=ASC(F$)
1770 TB=(TG-1)*2304+BG+LB
1780 IFTG<+1THENTG=0
1790 IFTB<+1THENTB=0
1800 DB=DB+TB:GU=GU+TG:GA=68-GU:
BU=BU+TB:BA=156672-BU
1810 IF X1=0 GOTO1860
1820 'PRINT DETAIL LINE
1830 PRINT#-2,USING" ### ";FG,FT
```

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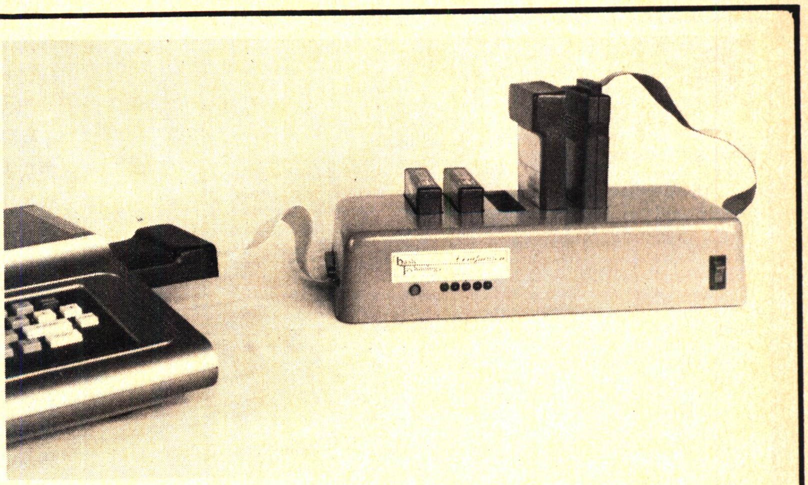
```
,FS,LG,LT,NS,LS,LB,TG;
1840 PRINT#-2,USING"###,###";TB
1850 LK=LK+1
1860 FU=FU+1
1870 IF LK>55 GOSUB2020
1880 'OUTPUT FILE
1890 R3$=STR$(HF):R3$=RIGHT$(R3$
,1)  'FILE TYPE
1900 TFT(HF)=TFT(HF)+1  'FILE TY
PE TOTALS
1910 R4$=STR$(TG):IF LEN(R4$)>2
THEN R4$=RIGHT$(R4$,2)  'GRANS
1920 IF LEN(R4$)<2 THEN R4$=" "+
R4$:GOTO1920
1930 R5$=STR$(TB):IF LEN(R5$)>6
THEN R5$=RIGHT$(R5$,6)  'BYTES
1940 IF LEN(R5$)<6 THEN R5$=" "+
R5$:GOTO1940
1950 IFLEFT$(N$,1)=" "THENN$="?"
+RIGHT$(N$,7)
1960 REC$=N$+E$+R$+R3$+R4$+R5$+D
ISK$+R6$
1970 PRINT#-1,REC$
1980 'GO BACK TO LOOP
1990 RETURN
2000 '
2010 'PAGE OFLO RPT #1
2020 IF LK=66 GOTO 2060  'PAGE O
FLO
2030 PRINT#-2:LK=LK+1:IF LK=66 G
OTO2060
2040 PRINT#-2,TAB(3)"'";SDISK$;"
' continued to next page":LK=LK+
1:IF LK=66 GOTO2060
2050 PRINT#-2:LK=LK+1:IF LK<>66
GOTO2050
2060 LK=0:RETURN
2070 '
2080 'CALC ML ADDR
2090 L1G=GR(GR):L2S=L1G AND 31:L
L=GR
2100 L3B=ASC(MID$(AA$,N*32+16,1)
)
2110 IF F1G<34 THEN TN=INT(F1G/2
) ELSE TN=INT(F1G/2)+1
2120 S1N=1+(F1G AND 1)*9
2130 DSKI$ DR,TN,S1N,A1$,B1$
2140 BP=ASC(MID$(A1$,4,1))*256+A
SC(MID$(A1$,5,1))
2150 BP$=HEX$(BP):BP$=STRING$(4-
LEN(BP$),"0")+BP$
2160 EP=BP+ASC(MID$(A1$,2,1))*25
6+ASC(MID$(A1$,3,1))-1
2170 EP$=HEX$(EP):EP$=STRING$(4-
LEN(EP$),"0")+EP$
2180 IF LL<34 THEN TN=INT(LL/2)
ELSE TN=INT(LL/2)+1
2190 S1N=(LL AND 1)*9+L2S
2200 DSKI$DR,TN,S1N,A1$,B1$:A1$=
A1$+LEFT$(B1$,127)
2210 IF L3B<2 THEN EA=0 ELSE EA=
ASC(MID$(A1$,L3B-1,1))*256+ASC(M
ID$(A1$,L3B,1))
2220 EA$=HEX$(EA):EA$=STRING$(4-
LEN(EA$),"0")+EA$
2230 IF EA$="0000" THEN EA$="???
?"  'UNKNOWN EXEC ADDR
2240 RETURN
2250 '
2260 'PRNT ML LINE RPT #1
2270 PRINT#-2,TAB(23)"ram addres
s for start,end,exec = $";BP$;",
$";EP$;",$";EA$
2280 LK=LK+1
2290 RETURN
2300 '
2310 I$=INKEY$:IF I$="" GOTO2310
2320 RETURN
2330 '
2340 'PRINTER EJECT
2350 IFLK>65THENLK=0
2360 IFLK=0THENRETURN
2370 IFLK<66THENPRINT#-2:LK=LK+1
:GOTO2370
2380 LK=0:RETURN
2390 '
2400 'P R N T   D I S K E T T E
  R P T S   # 2 , # 3
2410 '
2420 'RPT #2, PASS 1: DISKETTE N
AMES
2430 IFX1=1GOSUB2350  'EJECT IF
PREV RPT
2440 L$="names"  'REPORT #2 HEAD
ING
2450 GOSUB4340
2460 '
2470 'SORT DISKETTES TABLE (2 PA
SSES)
2480 PRINT"SORTING DISKETTE ";L$
;" REPORT...";
2490 FOR J = 1 TO TTL
2500 FOR K = J TO TTL
2510 IF R2=0 AND DN$(J) < DN$(K)
 GOTO2560
2520 IF R2=1 AND BU(J) < BU(K) G
OTO2560
2530 T1$=DN$(J):T2=FU(J):T3=BU(J
):T4=BA(J):T5=GU(J):T6=GA(J):T7=
FE(J)
2540 DN$(J)=DN$(K):FU(J)=FU(K):B
U(J)=BU(K):BA(J)=BA(K):GU(J)=GU(
K):GA(J)=GA(K):FE(J)=FE(K)
2550 DN$(K)=T1$:FU(K)=T2:BU(K)=T
3:BA(K)=T4:GU(K)=T5:GA(K)=T6:FE(
K)=T7
2560 NEXT K:NEXT J
2570 '
```

```
2580 'PRNT DISKETTES RPTS #2, #3
2590 PT=INT((TTL/55)+.9999999)
2600 IF (X2=1 AND R2=0) OR (X3=1
 AND R2=1) THEN PRINT"PRINTING D
ISKETTE ";L$;" REPORT..";
2610 FOR J = 1 TO TTL
2620 IF X2=0 AND R2=0 GOTO2810
'TO ACCUM
2630 IF LK=0 GOTO2670
2640 IF LK<60 GOTO2740
2650 PRINT#-2:LK=LK+1
2660 IF LK<>66 GOTO2650
2670 PK=PK+1
2680 PRINT#-2,TAB(5)DATE$;TAB(21
);CHR$(14);"diskette ";L$;CHR$(2
0)TAB(46)"page";PK;"of";PT
2690 PRINT#-2
2700 PRINT#-2,TAB(5)"diskette";T
AB(25)"no. of          bytes
bytes  grans  grans"
2710 PRINT#-2,TAB(5)"name";TAB(2
6)"files          used         unused
   used unused"
2720 PRINT#-2,TAB(5)"========";T
AB(25)"======";TAB(38)"=====";TA
B(49)"======  =====  ======"
2730 LK=5
2740 PRINT#-2,TAB(5)DN$(J);TAB(2
5);:PRINT#-2,USING"##,###";FU(J)
;
2750 PRINT#-2,TAB(33);:PRINT#-2,
USING"##,###,###";BU(J);
2760 PRINT#-2,TAB(45);:PRINT#-2,
USING"##,###,###";BA(J);
2770 PRINT#-2,TAB(56);:PRINT#-2,
USING"##,###";GU(J);
2780 PRINT#-2,TAB(63);:PRINT#-2,
USING"##,###";GA(J);
2790 IFFE(J)=1THENFE$="1":PRINT#
-2,TAB(71)"note" ELSE PRINT#-2,"
"
2800 LK=LK+1
2810 G1=G1+FU(J):G2=G2+BU(J):G3=
G3+BA(J):G4=G4+GU(J):G5=G5+GA(J)
2820 NEXT J
2830 '
2840 'PRNT TOTALS RPTS #2, #3
2850 IF X2=0 AND R2=0 GOTO2920
2860 PRINT#-2
2870 PRINT#-2,TAB(5)"  totals: "
;
2880 PRINT#-2,USING"##,###    ###
,### ###,###,### ###,###,### ##,
### ##,###";TTL,G1,G2,G3,G4,G5
2890 LK=LK+2
2900 IFFE$="1"THENPRINT#-2:PRINT
```



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```
#-2,TAB(12)"note: disk READ ERRO
R encountered on this diskette":
LK=LK+2
2910 '
2920 IF R2=1 GOTO3020  'END RPT
#3 (PASS 2)
2930 '
2940 'RPT #3, PASS 2: DISKETTE U
SAGE
2950 IFX2=1GOSUB2350  'EJECT IF
PREV RPT
2960 IFX3=0GOTO3010  'NOT REQSTD
2970 R2=1:PK=0:L$="usage":PRINT@
192,"";:G1=0:G2=0:G3=0:G4=0:G5=0
:GOTO2480
2980 '
2990 'G E N   D S K   O U T P U
T
3000 '
3010 'CLOSE & READ TAPE JUST CRE
ATD & LOAD TO DSK
3020 PRINT#-1,"END 0F F1LE":CLOS
E#-1
3030 GOSUB4340
3040 PRINT"remove YOUR LAST PROC
ESSED DISK":PRINT@160,"insert DI
SKETTE WHICH CONTAINS  ALL DIR P
ROGRAMS INTO DRIVE 0":PRINT@256,
"rewind TAPE & press PLAY BUTTON
 AND THE FILE FROM CASSETTE TAPE
 WILL BE TRANSFERRED TO DISK":PR
INT@384,"press ENTER"
3050 SOUND10,3:GOSUB2310
3060 GOSUB4340:PRINT"READING '";
FI$;"' TAPE FILE..."
3070 OPEN "I",#-1,FI$
3080 FI$=FI$+".DIR"
3090 PRINT@128,"WRITING '";FI$;"
' FILE... "
3100 OPEN "O",#1,FI$
3110 PRINT#1,DATE$
3120 LINE INPUT#-1,REC$
3130 IF REC$="END 0F F1LE" GOTO3
160
3140 PRINT#1,REC$
3150 GOTO3120
3160 CLOSE#-1
3170 '
3180 'WRITE DISK RPT #7
3190 REC$="T0TALS":WRITE#1,REC$
3200 GOSUB3570
3210 REC$="total diskettes in yo
ur system":WRITE#1,REC$,TTL
3220 GOSUB3570
3230 REC$="total bytes used":WRI
TE#1,REC$,G2
3240 REC$="total bytes not used"
:WRITE#1,REC$,G3
3250 IF (G2+G3) > 0 THEN I=(G2/(
G2+G3))*100:I=I+.5:I=INT(I):REC$
="percentage bytes used":WRITE#1
,REC$,I:I=(G3/(G2+G3))*100:I=I+.
5:I=INT(I):REC$="percentage byte
s not used":WRITE#1,REC$,I
3260 I=G2+G3:REC$="total bytes i
n your system":WRITE#1,REC$,I
3270 GOSUB3570
3280 REC$="total granules used":
WRITE#1,REC$,G4
3290 REC$="total granules not us
ed":WRITE#1,REC$,G5
3300 IF (G4+G5) > 0 THEN I=(G4/(
G4+G5))*100:I=I+.5:I=INT(I):REC$
="percentage granules used":WRIT
E#1,REC$,I:I=(G5/(G4+G5))*100:I=
I+.5:I=INT(I):REC$="percentage g
ranules not used":WRITE#1,REC$,I
3310 I=G4+G5:REC$="total granule
s in your system":WRITE#1,REC$,I
3320 GOSUB3570
3330 REC$="total basic programs"
:WRITE#1,REC$,TFT(0)
3340 REC$="total assembly langua
ge programs":WRITE#1,REC$,TFT(3)
3350 REC$="total machine languag
e programs":WRITE#1,REC$,TFT(2)
3360 REC$="total data files":WRI
```

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```
TE#1,REC$,TFT(1)
3370 I1=TFT(0)+TFT(3)+TFT(2):I2=
TFT(1):IF (I1+I2) > 0 THEN I=(I1
/(I1+I2))*100:I=I+.5:I=INT(I):RE
C$="percentage programs":WRITE#1
,REC$,I:I=(I2/(I1+I2))*100:I=I+.
5:I=INT(I):REC$="percentage data
 files":WRITE#1,REC$,I
3380 REC$="total programs/files
in your system":WRITE#1,REC$,G1
3390 GOSUB3570
3400 REC$="total different versi
ons flagged":WRITE#1,REC$,0
3410 GOSUB3570
3420 IFIOERR=0 GOTO3460
3430 REC$="total diskettes with
disk read errors":WRITE#1,REC$,I
OERR
3440 I=(IOERR/TTL)*100:I=I+.5:I=
INT(I):REC$="percentage diskette
s with disk errors":WRITE#1,REC$
,I
3450 GOSUB3570
3460 REC$="EXTRACT & LOAD DIRECT
ORIES report #1":WRITE#1,REC$,X1
3470 REC$="DISKETTE NAMES sorted
 report #2":WRITE#1,REC$,X2
3480 REC$="DISKETTE USAGE sorted
 report #3":WRITE#1,REC$,X3
3490 REC$="DISKETTE JACKET LABEL
S report #4":WRITE#1,REC$,X4
3500 REC$="DISKETTE GUM LABELS r
eport #5":WRITE#1,REC$,X5
3510 REC$="CONSOLIDATED DIRECTOR
IES report #6":WRITE#1,REC$,1
3520 REC$="DISKS DIRECTORY SUMMA
RY page report #7":WRITE#1,REC$,
1
3530 I=((X1+X2+X3+X4+X5+X6+X7)/7
)*100:I=I+.5:I=INT(I):REC$="perc
entage reports requested":WRITE#
1,REC$,I
3540 REC$="END":WRITE#1,REC$,0
3550 CLOSE#1
3560 GOTO3620
3570 REC$="1":WRITE#1,REC$,0:WRI
TE#1,REC$,0:WRITE#1,REC$,0:RETUR
N
3580 '
3590 'P R N T   D I S K E T T E
  J A C K E T   L A B E L S   R
P T   # 4
3600 '
3610 'RPT #4: DISKETTE JACKET LA
BELS
3620 IFX3=1GOSUB2350   'EJECT IF
PREV RPT
3630 IFX4=0GOTO4220   'NOT REQSTD
3640 '
3650 GOSUB4340:PRINT"PRINTING DI
SKETTE JACKET LABELS DIRECTORY R
EPORT.....                 ";
3660 OPEN"I",#1,FI$
3670 INPUT#1,REC$   'DATE
3680 INPUT#1,REC$
3690 '
3700 IFREC$="T0TALS"GOTO4170
3710 '
3720 LC=0
3730 DISK$=MID$(REC$,22,20)
3740 FORY=20TO1STEP-1
3750 IFMID$(DISK$,Y,1)<>" "THENZ
=Y:Y=0
3760 NEXTY
3770 IFZ<1ORZ>19THENW2$=DISK$:GO
TO3790
3780 X=(20-Z)/2:Y=INT(X):W2$=STR
ING$(Y," ")+LEFT$(DISK$,Z):W2$=W
2$+STRING$(20-LEN(W2$)," ")   'CE
NTR HDNG
3790 PRINT#-2,TAB(7);CHR$(14);W2
$;CHR$(20);TAB(34)"."   'HDNG
3800 PRINT#-2,TAB(22)DATE$;TAB(5
2)"."
3810 '
3820 SW=0:LC=2
3830 W1$=LEFT$(REC$,8)
```

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```
3840 IFW1$="++++++++"THENW2$="ds
k+read+err":GOTO3900
3850 FORY=8TO1STEP-1  'LEFT JUST
IFY NAME
3860 IFMID$(W1$,Y,1)<>" "THENZ=Y
:Y=0
3870 NEXTY
3880 IFZ<1ORZ>7THENW2$=W1$+"."+M
ID$(REC$,9,3):GOTO3900  'ATTACH
EXT ON BLNK NAME
3890 W2$=LEFT$(W1$,Z)+"."+MID$(R
EC$,9,3)+STRING$(8-Z," ")  'ATTA
CH EXT
3900 PRINT#-2,W2$;" ";  'NAME&EX
T
3910 '
3920 SW=SW+1  'COLUMN 1 TO 4
3930 IFSW=4THENSW=0:PRINT#-2,"."
:LC=LC+1  'COL4
3940 '
3950 HREC$=REC$
3960 INPUT#1,REC$
3970 IFREC$="T0TALS"GOTO4000
3980 IFRIGHT$(REC$,21)=RIGHT$(HR
EC$,21)GOTO3830  'SAME DISKETTE?
3990 '
4000 IFLC<20THENPRINT#-2,TAB(52)
".":LC=LC+1:GOTO4000  'REMAINING
 DOTS
4010 PRINT#-2,STRING$(53,"."):LC
=LC+1
4020 '
4030 IFFOOT=0 GOTO4080
4040 LK=LK+LC  '21 OR 42 OR 63
4050 IFLK>50 GOSUB2350
4060 GOTO3700  'NEW DISKETTE
4070 '
4080 FOOT=1  'PRNT FOOTING ONLY
ONCE
4090 PRINT#-2:PRINT#-2,TAB(7)"DI
SKETTE JACKET LABELS directory r
eport"
4100 PRINT#-2,TAB(8)"* cut along
 dotted line"
4110 PRINT#-2,TAB(8)"* and inser
t into diskette sleeve"
4120 PRINT#-2,TAB(8)"* or paste
onto diskette sleeve"
4130 PRINT#-2,TAB(8)"* or place
alongside diskette sleeve"
4140 LK=LC+6:GOSUB2350
4150 GOTO3700  'NEW DISKETTE
4160 '
4170 CLOSE#1  'END RPT #4
4180 '
4190 'E N D   O F   J O B
4200 '
4210 'RPTS #5, #6, #7
4220 IF X4=1GOSUB2350  'EJECT IF
 PREV RPT
4230 GOSUB4340
4240 PW$="DIR2":W$=" #5,
":IF X5=0 THEN PW$="DIR3":W$="S
#6, AND #7,"
4250 PRINT"press ENTER TO PROCES
S THE NEXT PROGRAM ";PW$;", FROM
 DRIVE 0, FOR PRINTING REPORT";W
$:PRINT"OR press 'E' TO EXIT TO
BASIC"
4260 GOSUB2310
4270 IFI$="E"THENEND
4280 IF X5=1 THEN RUN"DIR2.BAS"
ELSE RUN"DIR3.BAS"
4290 END
4300 '
4310 'M O R E   G O S U B S :
4320 '
4330 'SCREEN HDNG
4340 CLS2:PRINT@5,"EXTRACT DISKS
 DIRECTORY";
4350 PRINT@41,"PROGRAM 1 OF 3 ";
4360 PRINT@96,"";
4370 RETURN
4380 '
4390 'SCREEN FOOTING
4400 PRINT@418," IN CASE OF DISK
 READ ERROR ";
```

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```
4410 PRINT@450," type 'GOTO5000'
 THEN enter ";
4420 PRINT@96,"";
4430 RETURN
4440 '
4450 'DISK READ ERROR, USER MANU
ALLY GOTO'S HERE
5000 SOUND10,3:GOSUB4340:PRINT@1
33," WAIT ONE MOMENT......  ";:FU
=0:BU=0:BA=0:GU=0:GA=0:IOERR=IOE
RR+1:FE=1:PERR$=CHR$(127)+CHR$(1
28):PERR$=PERR$+"disk":PERR$=PER
R$+CHR$(128):PERR$=PERR$+"err"
5010 REC$="++++++++++++++0000000
"+DISK$+R6$
5020 PRINT#-1,REC$
5030 IFX1=0 GOTO5070  'NOT REQST
D
5040 PRINT#-2,TAB(12)"++++ disk
READ ERROR encountered on this d
iskette ++++"
5050 PRINT#-2,TAB(12)"+++++ gran
ules and bytes will not be accum
ulated +++++"
5060 LK=LK+2
5070 GOTO1240
5080 GOTO5000  'FOR 'STRIPPER' P
ROGRAM
5090 '
5100 PMODE0:PCLEARP:GOTO70
5110 'E N D
```

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Let your computer find the end of that file with this . . .

CLOAD Command Fixer

By Curt Chadwick

This article is dedicated to all of you out there with 64K, no disk, and a desire to learn assembly language programming. I don't have a disk either, and I spend a great deal of my computer time waiting for my worn but, trusty cassette recorder to save and load programs. One thing about BASIC that has always bothered me is the *CLOAD* command. How annoying to get an "I/O Error" and then have to keep typing *CLOAD*, or whatever method you might have devised to get to the beginning of the next program.

I've seen some rather unusual methods used to find the beginning of the next program. There's "Fast Fingers Fred" who manipulates the cassette buttons so fast as to find the break. Or . . . you could use the audio and motor commands to find the end. I leave the play button down and pull the earphone and remote plugs to find the end of the program which drives my wife crazy with the computer squawk coming from the recorder.

Wouldn't it be nice to just type *CLOAD* and have the computer search for the end of the file for you? Now that you have 64K it's time to put it to work. With 64K, BASIC is now in RAM! What that means is that if you would like to change BASIC you can! What is it about BASIC that you would like to change? I've already told you what I would like to change — the *CLOAD* command.

I've had my CoCo now for two years and have had as one of my objectives to learn at least some assembly language programming. To accomplish that objective I decided to try and understand the *CLOAD* command and learn enough assembly language to perform the patch. When I started looking in BASIC to find the subroutine that handles the *CLOAD* command there wasn't much help available except from members of my local computer club, which I would like to take this opportunity to thank. Now, there are magazines which publish or advertise a disassemble of the BASIC ROM. I've found that, for the beginner, they may lack many details and leave gaps in the explanation of what goes on in BASIC. If you compare comments by different authors, you might even think they were talking about separate subroutines. However, they are the best place to start.

There are also books which can help, Lance Leventhal's book *6809 Assembly Language Programming* and *TRS-80 Color Computer Assembly Language Programming* by William Barden, Jr. The subroutines for the cassette I/O start around *&HA6F3* and go all the way to *&HA880*. By the way the "*&H*" means Hex numbers. They may be foreign for awhile, but you do get used to them. Those subroutines are called by many different BASIC routines and the problem is to find the *CLOAD* command routine and then look for a way to "fix" it.

First, let's take a look at the tape format. Check the back of *Going Ahead With Extended Color BASIC* for the ROM subroutines. The WRTLDR turns on the cassette and writes a leader. BLKOUT writes a block to cassette and there are other names like BLKTYP, CBUFAD, and several others.

(Curt Chadwick holds a B.S. in mechanical engineering and is a major accounts manager for Caterpillar Tractor Co. He bought the CoCo for his family in 1981 and says he owes a lot of his knowledge and enjoyment to the Peoria Color Computer Club.)

If those names mean anything to you, or you understand the ROM subroutine section of the manual, then you probably won't need to read this article. When I started my goal to learn more about the computer and learn some assembly language, that ROM subroutine section was a mystery.

The listing below is a less mysterious representation of the tape format. The terms such as leader, sync byte, and so on should begin to mean something. The tone you hear is generated by *128-&H55's*. A *&H55* in binary is alternating ones and zeros which generates a tone to get the computer in sync with the tape.

Note the block type byte.

EXAMPLE:

55------55 55 3C 0 F I L E N A M E 2 0 0 2000 2400 2000 A2

128 - &H55's	Leader, the familiar tone at the beginning
Leader byte	1 Byte &H55 Make sure the tape is up to speed
Sync Byte	1 Byte &H3C Signals the start of a block
Block type	1 Byte 0=Title Block
File name	8 Bytes Padded with &H20 if needed
File Type	1 Byte: 0=Basic 1=Data 2=ML
Data type	1 Byte: 0=Binary &HFF=ASCII
Gap	1 Byte flag 0=Continuous flow &HFF=Gaps(Data)
MSB	Starting address(ML)
LSB	
MSB	Load address(ML)
LSB	
Check Sum	Number of bytes

55----55 55 3C 1 FF DATA..(0 to 255 BYTES)... FF

128-&H55's	Second leader tone
Data Block	
&H55	Leader Byte
&H3C	Sync Byte
Block Type	1=Data &HFF=EOF
Block Length	0to&HFF
Data	0 to 255 Bytes
Check sum	Sum of data+block type&block length

ADDITIONAL DATA BLOCKS DO NOT HAVE A LEADER TONE (128-&H55)

EOF BLOCK (End of File)

55 3C FF 00

Gap byte	1 Byte &H55
Sync byte	1 Byte &H3C
Block type	1 Byte &HFF (End of file)
Block Length	00

When you type *CLOAD*, BASIC recognizes it as a reserved word and goes to a table of locations to get the address for that routine in ROM. That ROM address is *&HA498*, which is partially disassembled in Listing 1. Don't forget, the disassembly is done by a beginner and lines are documented, which may be obvious to more experienced programmers. The routine checks to see if there is an *M* after *CLOAD* because there is no reserved *CLOADM* command. The *CLOADM* is actually a subroutine of the *CLOAD* command check, *&HA4FE*. Notice the subroutine at *&HA648* called "go search for file" shown in the disassembly "Listing 2." That subroutine is also called in the *CLOADM* subroutine.

The secret to fixing the *CLOAD* command is in the block type. The search for file routine (Listings 2 and 3) reads in a leader and block of data by calling *&HA701*. The *&HA701* subroutine reads a block and puts the block type in *&H7C*. The ORB checks to see if *&H7C* is a title block and/or if there are any errors. If it is not a title, then it does an RTS (return from subroutine) and prints an I/O Error. If it is a title block, it compares the title found to the title requested. If it doesn't match, it skips the rest of the file and looks for another title block.

If you start the tape in the middle of a file, of course, the first block read won't be a title block so the routine returns an I/O Error. If we start in the middle of a file, we don't really care if there is an I/O Error until after we find a title block. Also, we should ignore all blocks that aren't title blocks. Sound simple? Well, it is. Look at *&HA698*. If the program said to ignore I/O Errors and all blocks which are not titles and keep reading blocks until it finds a header, then it would be "fixed."

To fix the routine, you must first move the ROM to RAM with your "move ROM" program that boots 64K. The source code for the "fix" which modifies BASIC is in Listing 4. The program puts a jump in the "go search for file" routine at *&HA698* to point to the fix. At Line 180, the fix starts by storing the registers to make sure nothing is disturbed. The rest is fairly obvious. Lines 220-240 are the code which was replaced by the jump. The program is written in position independent code which means it can be put at any memory location and still run. I would suggest adding it on to your move ROM program so that when you boot the 64K the *CLOAD* is patched at the same time. For those of you without an editor assembler, boot 64K and type in the BASIC program in Listing 5. After you have checked for errors, *RUN* the program. Then save the machine language program by typing *CSAVEM "CLOADMOD", &HFD00, &HFD25, &HFD00.* As I said, you could append the program onto the move ROM program or run it separately.

The program runs without any problems except once in awhile I have gotten an I/O Error by starting in the middle of a file. I speculate that in the data there must be read a *&H55* and a *&H3C*. That triggers a read block which returns a check sum error. Should that ever occur, just type *CLOAD* again. I have never had it happen twice in a row. The fix is designed for 1.1 BASIC and I haven't checked to see if later versions are the same. If they are different, there should be enough discussion and listings so you can figure it out. I hope that by studying how to fix that pesky *CLOAD* I/O Error you have become interested in assembly language and maybe even learned some. I know I have.

Listing 1: "CLOAD routine"

```
A498      CLR 78        CLEAR FILE STATUS
A49A      CMPA #4A      IS THERE A"M" AFTER
                        "CLOAD"?
A49C      BEQ A4FE      IF SO GOTO CLOADM
                        ROUTINE
A49E      LEAS S+2      RESTORE STACK AND
                        RETURN
```

```
A4A0     JSR A5C5     STORE FILE REQUESTED
A4A3     JSR A648     GO SEARCH FOR FILE
```

Listing 2: "Go search for file"

```
A648     TST 78       CHECK FILE STATUS
A64A     BNE A61C     IF OPENED ERROR
A64C     BSR A681     "GO LOOK FOR FILE NAME"
A64E     BNE A619     CHECK FOR ERRORS
A650     CLR 79       CLEAR COUNTER
A652     LDX #1DA     LOC OF NAME FOUND
```

Listing 3: "Go Look For File Name"

```
A681     LDX #1DA     LOC TO PUT NAME OF FILE
                      NAME FOUND
A684     STX 7E       STORE IN BUFFER LOC
A686     LDA 68       CURRENT STATEMENT POINTER
A688     INCA
A689     BNE A696     IF NOT SKIP
A68B     JSR A928     GO CLEAR SCREEN
A68E     LDX 88       GET CURSER LOC
A690     LDB #53      "S"
A692     STB ,X++     PUT ON SCREEN AND SPACE OVER
A694     STX 88       STORE CURSER LOC
A696     BSR A701     READ LEADER AND BLOCK
A698     ORB 7C       CHECK FOR ERRORS AND TITLE
                      BLOCK
A69A     BNE A6D0     RTS AND PRINT ERROR
A69C     LDX #1DA     LOC OF FILE FOUND
A69F     LDU #1D2     LOC OF FILE REQUESTED
A6A2     LDB #8       LOAD COUNTER WITH 8 SPACES
A6A4     CLR ,-S
A6A6     LDA ,X+      LOAD WITH CHARACTER
A6A8     LDY 68       CURRENT POINTER LOC
A6AB     LEAY 1,Y     ROUTINE TO COMPARE CHAR OF
                      FILE REQUESTED WITH FILE
                      FOUND
A6AD     BNE A6B4
A6AF     CLR 6F
A6B1     JSR A282
A6B4     SUBA ,U+
A6B6     ORA ,S

A6B8     STR ,S
A6BA     DECB
A6BB     BNE A6A6
A6BD     LDA ,S+
A6BF     BEQ A6CB
A6C1     TST -9,U
A6C3     BEQ A6CB     IF RIGHT NAME BRANCH DOWN
A6C5     BSR A6D1     IF NOT SKIP REST OF FILE
A6C7     BNE A6D0     IF ERROR RTS
```

Listing 4:

```
00100                          *MODIFY CLOAD COMMAND
00110     PATCH     NOP
00120               LDX        #$A698 PUT PATCH IN BASIC
00130               LDA        #$7E  JUMP
00140               STA        ,X+
00150               LEAY       START, PCR LOCATION OF
                               PROGRAM
00160               STY        ,X
00170               RTS           RETURN TO BASIC
00180     START     PSHS       A,B,X,Y, CC    STORE
                               EVERYTHING
00190               LDA        $7C     GET BLOCK TYPE
```

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```
00200          BNE     REREAD  IF NOT TITLE
                       REREAD
00210          PULS    A,B,X,Y,CC     PUT
                       EVERYTHING BACK
00220          ORB     $7C     FILL IN BYTES
                       REPLACED W/ PATCH
00230          LBNE    $A6D0
00240          JMP     $A69C
00250   REREAD PULS    A,B,X,Y,CC     REPLACE
                       STACK
00260          JMP     $A696   GOREAD
                       ANOTHER BLOCK
00270          END
```

```
A6C9     BRA A686     IF NOT RIGHT FILE START
                      OVER
A6CB     LDA #46      "F" FOR FOUND
A6CD     BSR A6F8     PUT "F" ON SCREEN
A6CF     CLRA
A6D0     RTS
```

Listing 5:

```
1       'LISTING 5
2       'MODIFY CLOAD COMMAND
5       READ A$,B$
6       'GET STARTING AND ENDING ADDRESS-
        TO CHANGE ADDRESS CHG THE TWO
        NUMBERS IN LINE 100
7       H$="&H"
8       A=VAL(H$+A$): B=VAL(H$+B$)
9       'CONVERT TO HEX
10      C=B-A+1
15      'DETERMINE NUMBER OF BYTES
20      FOR D=1 TO C
25      READ A1$ 'READ BYTES OF DATA
30      POKE A, VAL(H$+A1$)
33      'POKE PROGRAM INTO MEMORY
35      A=A+1: NEXT D
100     DATA FD00,FD24
102     DATA 8E,A6,98
104     DATA 86,7E
106     DATA A7,80
108     DATA 31,8D,00,04
110     DATA 10,AF,84
112     DATA 39
114     DATA 34,37
116     DATA 96,7C
118     DATA 26,0B
120     DATA 35,37
122     DATA DA,7C
124     DATA 10,26,6A,C6
126     DATA 7E,A6,9C
128     DATA 35,37
130     DATA 7E,A6,96
```

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Playing the Game of Heroic Fantasy

By George Firedrake & Art Canfil
Rainbow Contributing Editors

Anyone can learn how to play by playing-by-mail. We suggest you begin with the game *HEROIC FANTASY*. Your hand-picked cast of characters will explore a labyrinth replete with glittering treasure guarded by hordes of slavering monsters.

Begin by getting the rules. Send $2 to Flying Buffalo, Inc., Dept. GMA, P.O. Box 1467, Scottsdale, AZ 85252-1467. When you get the rules, create a list of up to 15 characters as your adventuring party. You then enter the game by sending in your group of adventurers along with orders on what they are to do. Soon, Flying Buffalo's computer will tell you what happened, then await further orders. Each set of orders is a *turn*. You can elect to send two turns a week, or one turn a week, or a turn every two weeks, or once a month. We suggest every two weeks for your first game.

There is a set-up fee to enter the game and a turn fee each time you send in a turn. You can do it by good old U.S. mail or via electronic mail on The Source. The $2 rule book tells all.

Your characters can be human or otherwise. Each character is either a *fighter* or a *magic-user*, but not both. The strength (STR) of a character is used to attack other characters or monsters, to defend oneself and others, cast magic spells, and do numerous other things. The CON (construction) of a character determines the amount of damage a character can withstand and continue living.

Each character has a price, shown in the following table.

CODE	KINDRED	CLASS	STR	CON	COST
F	Fairy	Fighter	1	1	1
		Magic-user	1	1	2
G	Gremlin	Fighter	3	4	3
L	Leprechaun	Magic-user	3	4	3
H	Hobbit	Fighter	5	15	5
		Magic-user	4	15	7
K	Goblin	Fighter	7	20	6
P	Human	Fighter	15	30	9
		Magic-user	10	30	11
E	Elf	Fighter	25	25	15
		Magic-user	20	25	18
D	Dwarf	Fighter	30	40	23
		Magic-user	30	40	36
O	Ogre	Fighter	35	40	29
		Migic-user	35	40	46
T	Troll	Fighter	50	50	57
X	Giant	Fighter	60	60	72

Ready To Assemble A Party Of Adventurers?

You Have 100 Points To Spend.

As you see, giants are expensive. If you include a giant, you have only 28 points left to spend on lesser creatures. How should you spend your points to get a party of adventurers with a good chance of surviving and thriving in the labyrinth? Here are some hints.

— You will probably need *both* fighters and magic-users.
— STR and CON are important. Try to get lots of both in your party. What is the total STR and the total CON of your group?
— The ratio of STR to COST and CON to COST might be a useful index to help you choose. Here are some examples.

Elf fighter: STR/COST=1.67
CON/COST=1.67
Hobbit magic-user: STR/COST=.56
CON/COST=2.14

Write a CoCo program to compute STR/COST and CON/COST ratios for all possible characters.
— Load up your CoCo with the information in the table and call it up when needed.
— Write a simple spreadsheet program to help you spend those 100 points effectively. Try out several mixtures of characters. Remember, the bottom line has total STR, total CON, and points spent.

We will sign up for *HEROIC FANTASY* and make a turn every two weeks. We encourage you to join us. Perhaps we will meet in the labyrinth. Every month, we will share our adventure here in *GameMaster's Apprentice* and show you the programs we write to help us play.

Who Is A Character?

A character is any imaginary person or other creature created according to the rules of a game system. The characters you choose in *HEROIC FANTASY* are quite simple. The characters in *Dungeons & Dragons* or *RuneQuest* are much more detailed and complex. Characters in *Adventurer's Handbook* are simplified versions of the kinds of characters found in the very elegant *RuneQuest* system and several other game systems published by Chaosium.

Meet Aloysious Anonymous, who lives in a village near Triford in Wundervale. He is described by the following *character record.*

Aloysious has basic characteristics, nine skills, and several other things. If we play him in a game and he survives, some of the information will change and more information might be added to his character record.

A game player will have several characters, perhaps dozens of characters, with a character record for each character. Next time, we'll begin building CoCo programs to store, retrieve, delete, edit, and otherwise manipulate information in a file of character records. In the meantime, we'll describe some of the items on the character record.

A character begins with seven basic characteristics.

STR is strength. This is plain old muscle power. It determines how much your character can lift and carry, affects his or her ability to use weapons, and is a factor in all those activities that require brute force.

> ***"Your hand-picked cast of characters will explore a labyrinth replete with glittering treasure guarded by hordes of slavering monsters."***

CON is constitution. It is a measure of health and physical well-being. CON is the most important characteristic in determining the amount of damage your character can take before becoming unconscious or even dying.

SIZ is size. It combines height and weight into one number. Large characters can absorb and dish out more damage during fighting, but find it more difficult to defend themselves, hide, or squeeze through small spaces. Small characters have the opposite advantages and disadvantages.

INT is intelligence. This measures how smart your character is. It is difficult to play a smart character unless you are smart. It is sometimes difficult for a smart person to play a dumb character. Accept the challenge — play the role!

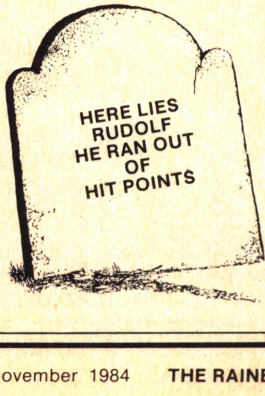
POW is power. This is a measure of your character's psychic ability or potential. A character with higher POW is luckier and more intuitive than a character with lower POW. In a game world that includes magic, POW resists spells cast on your character and is the power source for casting spells.

DEX is dexterity, quickness, and agility. A character with low DEX is clumsy. A character with high DEX is quick, agile, and good at fighting, dodging, running, and doing those things that athletes are good at.

CHA is charisma. This measures your character's ability to persuade, lead, and inspire (or subvert) other characters. It is commonly used when your character tries to talk her way out of a tight spot or convince others to follow her.

For a human character, each characteristic has a value from three to 18. A character with STR 18 is very, very strong. A character with STR 3 is probably too weak to survive in a game. In previous episodes of *GameMaster's Apprentice*, we have shown several ways to obtain values for the seven fundamental characteristics.

A healthy, uninjured character has a number of HIT PTS. equal to his or her CON. This number is circled on the character record. In case of injury or illness, damage to a character is marked off against the character's hit points. If hit points get down to one, the character becomes unconscious. If the hit points reach zero, the character dies.



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Think of POW points as a battery that powers magic. When a character is fully "charged up," the number of power points is the same as the character's POW. When a character uses magic, power points are spent to make the spell work, if it does work. If power points are reduced to zero, the character dies.

Both hit points and power points are restored by rest, good nutrition, and tender loving care.

Next time, we will describe more of the information on the character record. In the meantime, think about how you would store complete information on a character, change it, retrieve it, add to it, and so on. If you have a printer, perhaps you would like a program to print a blank character record sheet or one with the information for a character included.

TAIPAN: A Game In Context

You begin as a China Trader, operating out of Hong Kong in the mid 1800s. You begin with one small ship and one gun for defense against pirates. You are in debt to Elder Brother Wu, chief of one of the underground Chinese secret societies. Indeed, Mr. Wu is happy to loan you money, at an exorbitant interest rate.

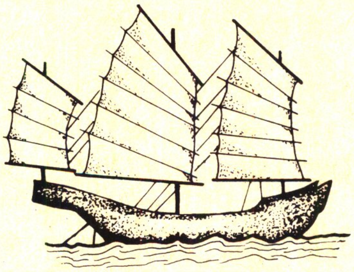
Your ports of call are Hong Kong, Foochow, Shanghai, Nagasaki, Manila, Singapore, Batavia, Saigon, Calcutta, and Liverpool. Possible cargoes are rice, pepper, arms, tea, silk, and opium. You hope to buy low and sell high.

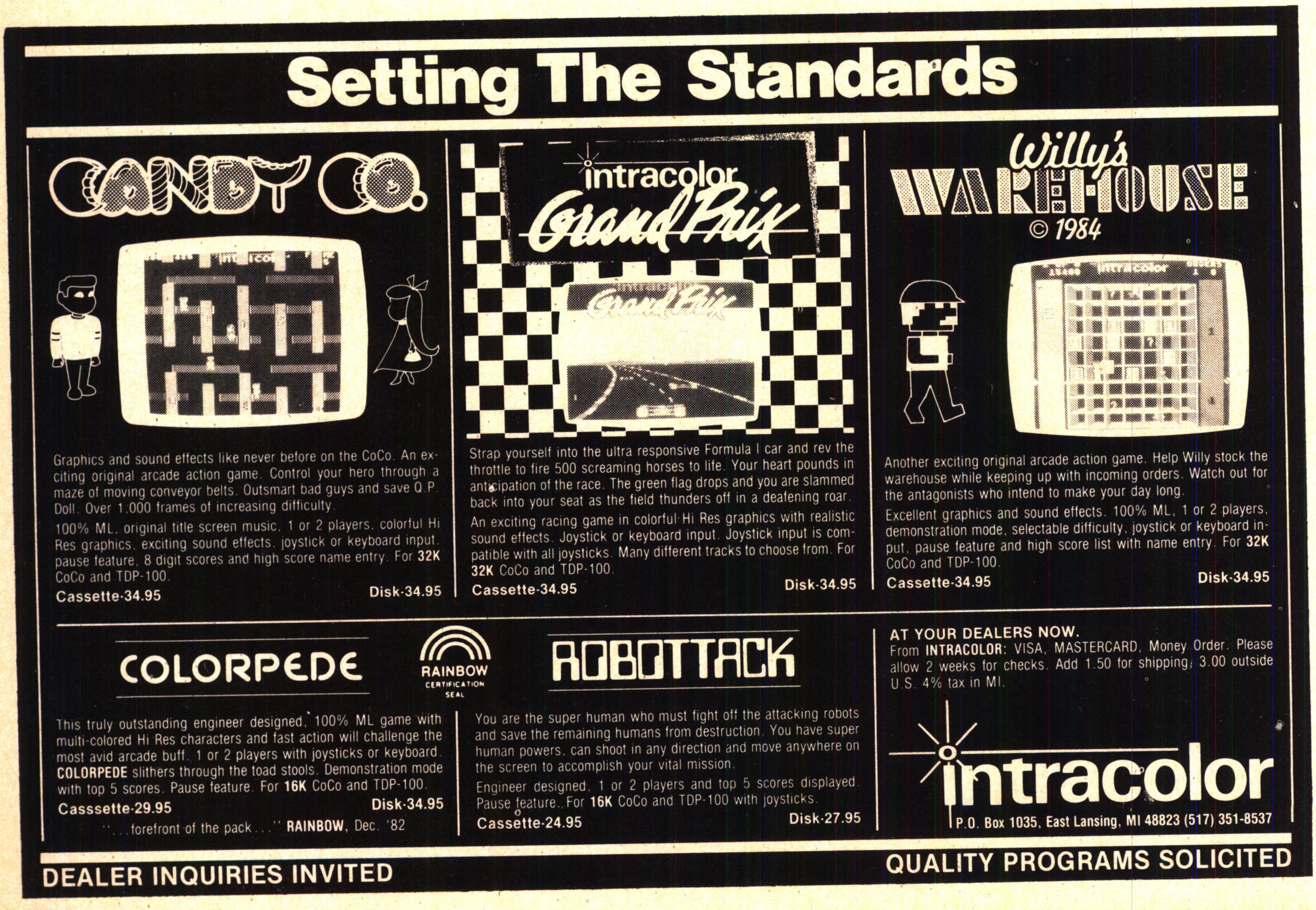
Before you load up and debark from Hong Kong to seek your fortune, you are visited by an emissary of Li Yuen, seeking a "donation" to his favorite charity, the building fund of the temple of Tin Hau, a Chinese Sea Goddess.

Let's face it: most people would consider Li Yuen a pirate. But he fancies himself as X, the head of a private maritime protective agency, employing a few thousand rough and ready fellows from many nations, men who might be on the wrong side of the law were it not for Li. He has a huge fleet of armed junks and lorchas patrolling coastal waters and the high seas in order to protect his "clients," those who donate to the temple of Tin Hau.

What cargo will you select? Perhaps a mix of two or more types of goods. Usually, rice is cheapest. Of course, you probably know that throughout Asia, rice is the primary food. But what about those other possible cargoes: pepper, arms, tea, silk, and opium?

Chinese tea was an item of huge economic importance in Europe, especially in Britain. Introduced into China dur-





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Willy's WAREHOUSE © 1984

Another exciting original arcade action game. Help Willy stock the warehouse while keeping up with incoming orders. Watch out for the antagonists who intend to make your day long.

Excellent graphics and sound effects. 100% ML, 1 or 2 players, demonstration mode, selectable difficulty, joystick or keyboard input, pause feature and high score list with name entry. For **32K** CoCo and TDP-100.

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RAINBOW CERTIFICATION SEAL

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ing the time of the Han Empire (206 B.C.—220 A.D.), tea was originally considered a medicine, later a pleasing drink as we know it. During the 1700s, tea became the national beverage of the English. Merchants and officials of the Ch'ing dynasty in China, and their British counterparts, reaped huge profits from the tea trade. In the 1800s tea comprised three-fifths of China's exports.

We use pepper to represent spices in general, thus reserving the letter 'S' for silk. To make the game easy to play, we want to use single letters to select items: 'R' for rice, 'P' for pepper, 'A' for arms, and so on. Spices brought the Portuguese to Asia. A desire for a piece of the spice trade motivated the voyages of Christopher Columbus, who found America instead.

Silk also has a long history. The ancient Romans imported so much silk from the Han Empire that the one-sided trade severely damaged the economy of the Roman Empire. Later, Marco Polo followed the inland silk route to China.

In the late 1700s, the British attempted to balance their growing imports of tea and silk with items of export, lest all British gold and silver end up in China. They chose cotton and opium from India. Since the British controlled India, they could obtain these items cheaply.

Opium was known in China, and used sparingly as a medicine. The importation of vast amounts of this narcotic drug by the British caused the opium habit to sweep across China like a plague. The Chinese tried to suppress the opium trade. England launched the Opium War (1839—1842) in part to maintain the opium trade, even though it was physically, mentally, politically, and economically destructive to the Chinese.

This is the setting in which you, with your tiny ship and one gun, set out to seek your fortune. Will you become a tai-pan?

Game & Hobby Stores

To learn more about role playing games, visit a game and hobby store. Browse the games, books, magazines, dice, and other paraphernalia. Ask for names of GameMasters or Dungeon Masters who might run a beginner's game where you can play.

ROLE PLAYING GAMES

Millions of people play fantasy role playing games. A role playing game is a game in which one or more players create and play characters (adventurers) who live their imaginary lives in a specially made game world. The game world is created, managed, and operated by a GameMaster (GM), referee, or dungeon master (DM).

Most people who play role playing games use a formal rule system. Some of the best known are shown below.

Champions. *Hero Games, 92A 21st Avenue, San Mateo, CA 94402.*

Dungeons & Dragons (D&D). *TSR, P.O. Box 756, Lake Geneva, WI 53147.*

RuneQuest (RQ). *Chaosium, P.O. Box 6302, Albany, CA 94706.*

Traveller. *Game Designer's Workshop, P.O. Box 1646, Bloomington, IL 61701.*

Tunnels & Trolls (T&T). *Blade, P.O. Box 1210, Scottsdale, AZ 85252.*

Beginners beware! The rule books are formidable. If you are a beginner, we suggest you start with one of the following books, both from Reston Publishing Company, 11480 Sunset Hills Road, Reston, VA 22090.

Adventurer's Handbook: A Guide to Role Playing Games *by Bob Albrecht & Greg Stafford.*

Through Dungeons Deep *by Robert Plamondon.*

In "GameMaster's Apprentice," we include how-to-play information for all beginners.

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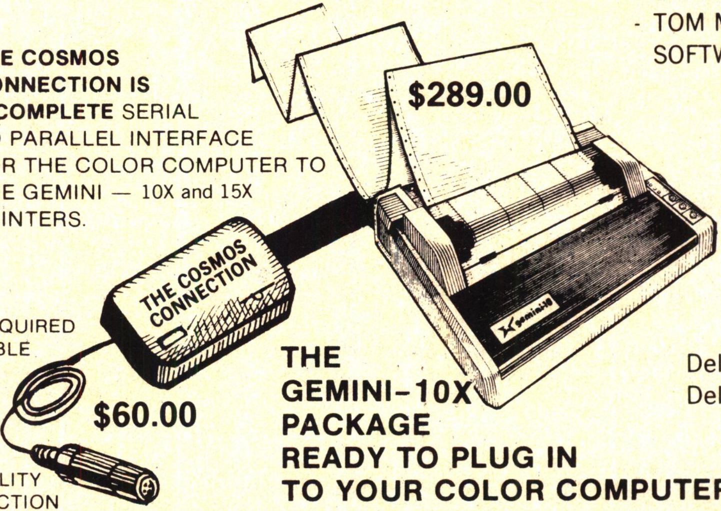

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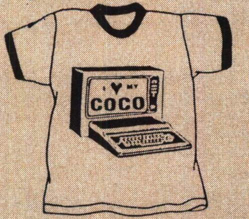

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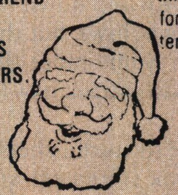

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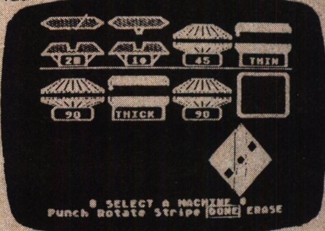

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Continuing The Rainbow Checkbook

By Richard White
Rainbow Contributing Editor

Something bothered me about last month's column. At this point we had code to start a new file, but no way to get the running checkbook balance going. I was able to enter some transactions and scroll up and down through the entries (we will cover the scrolling below), but there sat big, fat zeros in the balance column. Some more thinking about things that happen when a person starts a new file was in order.

First, the best and maybe only time to start a check file is when the checkbook and the last bank statement are fully reconciled. The checkbook balance for the last item cleared by the bank will be different from the bank's reported balance by exactly the net amount of the outstanding transactions that have not yet cleared the bank. That bank balance was entered in Line 2120. Now, if the outstanding items in the checkbook listed prior to the last cleared item were subtracted (checks and charges) or added (deposits or credits), the checkbook balance will not match the program's balance; not until all such outstanding items had been entered. Then the program's balance will match the checkbook's and it will continue to track the checkbook balance from then on. Since we don't start a new file very often there will be no problem as long as the user understands what is happening.

While one cannot be sure the user will understand even if the computer sends a message, the chances of success are 10 times better than if the same message is in the documentation. Line 2120 and 2125 were changed as below to print the message.

```
2120 CLS:GOSUB50:PRINT:PRINT:PRINT"ENTER LAST
     BANK STATEMENT       BALANCE  ";:
     LINEINPUTI$:BB=VAL(I$):PRINT@128,
     STRING$(64,32):PRINT@128,"note:  REPORTED
     CHECKBOOK       BALANCE WILL NOT MATCH
     YOUR     BALANCE UNTIL OUTSTANDING"
2125 PRINT"CHECKS, CHARGES, DEPOSITS
     AND   CREDITS AT STATEMENT TIME
     ARE   ENTERED.";:GOSUB1:CB=BB:
     GOSUB52:GOSUB54:GOSUB56:PRINT@128,
     STRING$(192,32)
```

After the text, there is a *GOSUB1* to the *INKEY$* with cursor routine to allow the user to read the message and press a key to continue. The bank balance is moved into the variable CB, the checkbook balance. Subroutines 52, 54, and 56 print the permanent input screen messages as discussed last month. The other key changes occur in Line 60 through 66.

```
60 GOSUB22:GOSUB30:GOSUB36:GOSUB40:RETURN
62 GOSUB26:GOSUB30:GOSUB36:GOSUB40:RETURN
64 GOSUB28:GOSUB30:GOSUB36:GOSUB40:RETURN
66 I$=CHR$(13):GOSUB22:FG=1:GOSUB30:GOSUB36:
   FG=0:GOSUB40:RETURN
```

(Richard White has a long background with microcomputers and specializes in BASIC *programming. With Don Dollberg, he is the author of the* TIMS *database management program.)*

The only change in these lines is to call subroutine 36 rather than 37. Line 36 calculates a new checkbook balance and falls to 37 where it is printed. Now the checkbook balance printout was tested for the first time and a bug was found. The print locations for the checkbook balance were one space too far right. The corrected lines are shown below. If you have typed these in already, change the *PRINT@120* in 11 to 119 and 248 in 15 to 247.

```
11 PRINT@96,USINGS4$;LC$;:PRINT" "LD$:
  PRINT@108,USINGSS$;LA:PRINT@119,USINGSS$;LB;:
  PRINTSTRING$(63,32);:PRINT@128,USINGSN$;LS$;:
  PRINTLN$:RETURN
15 PRINT@224,USINGS4$;CC$;:PRINT" "CD$:
  PRINT@236,USINGSS$;CA:PRINT@247,USINGSS$;CB;:
  PRINTSTRING$(63,32);:PRINT@256,USINGSN$;CS$;:
  PRINTCN$:RETURN
```

To review and edit data, we need to be able to scroll back and forth through the database using the arrow keys. The program needs to look at the key entry at the beginning of each new entry and enter scroll mode if it sees an up arrow. This also puts the program in the scroll mode preventing access to data entry routines. This is accomplished in Line 2150.

```
2150 I=INSTR(1,"DAVES"+CHR$(94)+CHR$(10),I$):
      IFFG=0THENONI GOSUB62,64,66,200,900,68,18
      ELSEONI GOSUB2160,2160,2160,200,900,17,18
```

The keystroke in I$ is checked by the *INSTR* statement. If the keystroke is an up arrow, *CHR$(94), I* is set to 6. *INSTR* starts in the string *DAVES* looking for a match and then goes to the arrow codes, counting as it goes. When it finds a match it returns the character count up the string or 0 if there is no match. If the program is in the data entry mode, *FG*=0 and the *ON I GOSUB* after the *THEN* is used. If the program is in scroll mode, *FG*=1 and control goes to the *ON I GOSUB* after the *ELSE*. In this *ON I GOSUB* the first three calls are Line 2160 denying access to the data entry mode. If FG=0, an up arrow calls Line 68, otherwise Line 17 is called.

```
68 PRINT@320,"REVIEW ENTRIES         ";:PO=335:
  FG=1:GOSUB17:RETURN
```

This sets up the scroll mode by printing REVIEW ENTRIES, setting *PO=335* to put the cursor on the same line and setting *FG=1*. Then Line 17 is called. We will be dealing extensively with the variables in the table following Line 17, so give it a quick once over and be ready to come back to it if you need to keep things straight.

```
17 IFCR>1THENCR=CR-1:GOSUB14:GOSUB12:GOSUB11:
  RETURNELSERETURN
```

VARIABLE LISTING

PURPOSE	CURRENT	LAST
Check #	CC$	LC$
Date	CD$	LD$
Amount	CA	LA
Balance	CB	LB
Status	CS$	LS$ Cleared or Outstanding
Note	CN$	LN$
Current Record Number		CR
Next Record to Enter		LR
Last Bank Balance		BB

CR is the count of the current record, the lower of two displayed. As long as CR is greater than one, there is a previous record to display as the current record, so CR is reduced by one. Then the program goes to three subroutines which reprint the record portion only on the screen.

```
14 CC$=LC$:CD$=LD$:CA=LA:CB=LB:CS$=LS$:CN$=LN$
```

Current record variables start 'C' while those for the previous record are 'L' for last variables. Since we want to make the previous record into the current (bottom) one on the string, the first task is to move the data in the L-variables to the C-variables. This Line 14 does. We wrote earlier about Line 15, which prints the current record data as the bottom entry on the screen. The program falls from Line 14 to 15 and the printing is done. Line 15 carries the RETURN.

Now things get complicated. In Line 38, we put some of the data for a record into a single string with each field like check number, date, status and note separated by a dollar sign. What else in a program about money? Here is how a string might look: *A$(22) = "0123$08/22/84ORAINBOW SUBSCRIPTION"*. Now we need to take the string apart to recover that data.

```
2 F=INSTR(F1,A$(V),"$"):RETURN
```

Our tool will be the *INSTR* statement in Line 2 above. We will use it over and over. We want to get data from the record in string *A$(V)* starting at character position F1 and going to the position just before the next '$'. In Line 2, we find the position of the '$' in variable *F* and RETURN to the calling routine to get the specific data. For the scroll backward routine, Line 2 is called by Line 12 which gets the data from the string.

```
12 F1=1:V=CR-1:GOSUB2:LC$=MID$(A$(V),F1,F-F1):
  F1=F+1:GOSUB2:LD$=MID$(A$(V),F1,F-F1):
  LS$=MID$(A$(V),F+1,1):LN$=MID$(A$(V),F+3,
  LEN(A$(V))-F+3):LA=A(V,0):LB=A(V,1):RETURN
```

First, *F1* is set to one to start things at the beginning of *A$(V)*. Next *V* is assigned the value *CR-1* since we are looking for the record before the current one. Next, subroutine 2 is called to get F. Now we can recover th last check number into *LC$* as a string. In *MID$(A$(V),F1,F-F1),* start at position *F1* and get a string *F-F1* characters long from string *A$(V)*. Now that wasn't too bad. If it works once it should work again to get a date into *LD$*. Set *F1* to *F+1*, the string position after the '$' and *GOSUB 2*. The *MID$* code to fill *LD$* is identical to what we used before, but the values in *F1* and *F* are different. Note, just past the '$' at *F* is a one-character status indicator, so we don't have to *GOSUB 2*. In the *MID$* for *LS$* starting at *F+1* and getting one character does the job. After the status character is a '$' and then the note which goes to the end of the string. So the start point must be *F+3*. The length of the note will be *LEN(A$(V))* less the start position *F+3*. So, these are used in another *MID$* to get the note into *LN$*. The amount and the balance are in an array so they are easily obtained using *LA = A(V,0)* and *LB = A(V,1)*.

Even the most complicated code is nothing more than a series of small pieces. In fact, the logic to put that piece together was tougher than writing the code itself. All that remains is to print the last record data at the top of the screen which subroutine 11, discussed earlier, does.

```
18 IFCR<LR-1THENCR=CR+1:GOSUB10:GOSUB16:GOSUB15:
   RETURNELSEGOSUB40:RETURN
```

Scrolling forward is nearly the same as scrolling backward. However, we do need to do a few things as we come to the end of the file. In Line 18, we first test if the current record is the one before the value in *LR*. *LR* carries the number of the next record to be entered so there is no data in that record yet. If *CR<LR-1* is true, add one to *CR* and rewrite the screen with a new current and previous record. Try following subroutines 10, 16 and 15 yourself. If *CR<LR-1* is false, *CR* must equal *LR-1* and the program is sent to 40 to prepare the screen for data entry. Line 10 was discussed earlier here. Lines 15 and 16 are shown below.

```
15 PRINT@224,USINGS4$;CC$;:PRINT"
   "CD$:PRINT@236,USINGSS$;CA:PRINT@248,USINGSS$;
   LB;:PRINTSTRING$(63,32);:PRINT@256,USINGSN$;
   CS$;:PRINTCN$:RETURN
16 F1=1:V=CR:GOSUB2:CC$=MID$(A$(V),F1,F-F1):
   F1=F+1:GOSUB2:CD$=MID$(A$(V),F1,F-F1):
   CS$=MID$(A$(V),F+1,1):CN$=MID$(A$(V),F+3,
   LEN(A$(V))-F+3):CA=A(V,0):CB=A(V,1):RETURN
```

Next month, we need to deal with the other way to get records into the program, that is loading a tape or disk file. To put things in proper order, there needs to be a file to load. So we need to write the code to save the file. This establishes the file form and the input code exactly reflects this form. There also needs to be some housekeeping and we might as well write for both tape and disk files. A tape user will be able to run the program since it will never see Disk BASIC code when loading and saving to tape. Later, a tape user can upgrade to disk and be up and running immediately. This also allows archiving files to tape from a disk system. However, at $2.50 a disk, disk storage is about as cost effective as tape storage and much more convenient. Finally, since hard copy from a printer is really a way of saving data, we will put the printer choice on the Save menu.

The listing:

```
 2 F=INSTR(F1,A$(V),"$"):RETURN
11 PRINT@96,USINGS4$;LC$;:PRINT"
 "LD$:PRINT@108,USINGSS$;LA:PRIN
T@119,USINGSS$;LB;:PRINTSTRING$(
63,32);:PRINT@128,USINGSN$;LS$;:
PRINTLN$:RETURN
12 F1=1:V=CR-1:GOSUB2:LC$=MID$(A
$(V),F1,F-F1):F1=F+1:GOSUB2:LD$=
MID$(A$(V),F1,F-F1):LS$=MID$(A$(
V),F+1,1):LN$=MID$(A$(V),F+3,LEN
(A$(V))-F+3):LA=A(V,0):LB=A(V,1)
:RETURN
14 CC$=LC$:CD$=LD$:CA=LA:CB=LB:C
S$=LS$:CN$=LN$
15 PRINT@224,USINGS4$;CC$;:PRINT
""CD$:PRINT@236,USINGSS$;CA:PRIN
T@248,USINGSS$;LB;:PRINTSTRING$(
63,32);:PRINT@256,USINGSN$;CS$;:
PRINTCN$:RETURN
16 F1=1:V=CR:GOSUB2:CC$=MID$(A$(
V),F1,F-F1):F1=F+1:GOSUB2:CD$=MI
D$(A$(V),F1,F-F1):CS$=MID$(A$(V)
,F+1,1):CN$=MID$(A$(V),F+3,LEN(A
$(V))-F+3):CA=A(V,0):CB=A(V,1):R
ETURN
17 IFCR>1THENCR=CR-1:GOSUB14:GOS
UB12:GOSUB11:RETURNELSERETURN
18 IFCR<LR-1THENCR=CR+1:GOSUB10:
GOSUB16:GOSUB15:RETURNELSEGOSUB4
0:RETURN
60 GOSUB22:GOSUB30:GOSUB36:GOSUB
40:RETURN
62 GOSUB26:GOSUB30:GOSUB36:GOSUB
40:RETURN
64 GOSUB28:GOSUB30:GOSUB36:GOSUB
40:RETURN
66 I$=CHR$(13):GOSUB22:FG=1:GOSU
B30:GOSUB36:FG=0:GOSUB40:RETURN

68 PRINT@320,"REVIEW ENTRIES
    ";:PO=335:FG=1:GOSUB17:RETUR
N
2120 CLS:GOSUB50:PRINT:PRINT:PRI
NT"ENTER LAST BANK STATEMENT
   BALANCE   ";:LINEINPUTI$:BB=VA
L(I$):PRINT@128,STRING$(64,32):P
RINT@128,"note:  REPORTED CHECKB
OOK        BALANCE WILL NOT MATCH
 YOUR      BALANCE UNTIL OUTSTAND
ING"
2125 PRINT"CHECKS, CHARGES, DEPO
SITS AND   CREDITS AT STATEMENT
TIME ARE   ENTERED.";:GOSUB1:CB=
BB:GOSUB52:GOSUB54:GOSUB56:PRINT
@128,STRING$(192,32)
2150 I=INSTR(1,"DAVES"+CHR$(94)+
CHR$(10),I$):IFFG=0THENONI GOSUB
62,64,66,200,900,68,18ELSEONI GO
SUB2160,2160,2160,200,900,17,18
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Force A Cold Start From Reset With This Simple Project

By Tony DiStefano
Rainbow Contributing Editor

Does this ever happen to you? You are playing a nice game, or heavy into some database. Then, you get tired and want to quit. So, you hit the Reset button in hopes of clearing what is in memory, and the software appears on the screen again. So you hit the Reset button again in disbelief but to no avail, it comes right back. There is no way of getting out of it. You then proceed to a power down routine. First you open the doors to all your drives, to avoid destroying a disk. Then you turn the computer off. Count to 15 and then turn the computer back on. Next you close the doors to the drives in use. It happens to me all the time, especially when I use protected software. Well, I decided to do something about it.

Before I get into the construction part of this article, a little theory on what is happening. When someone first turns on the computer, it does what I call "a cold start routine." It does things like check how much memory is present and initializes the PIA and SAM chips. It then initializes all the necessary pointers, etc. Before it turns control over to the user by putting the OK prompt on the screen, it puts the value $55 ($ denotes a Hex number) or 85 in decimal in location $71, 113 in decimal. But first it checks to see if it has been on before (if it has done this initializing routine before). It does this by seeing if memory location $71 or 113 in decimal contains $55 or 85 in decimal. If it does, it means the computer has already been on before the Reset button was pressed and that it does not have to do a cold start. Instead, it does a warm start. This warm start first initializes the PIAs and SAM chips only and then jumps to the warm start vector. The warm start vector is located in memory locations $72 and $73, 114 and 115 in decimal.

(Tony DiStefano is well known as an early specialist in Color Computer hardware projects. He is one of the acknowledged experts on the "insides" of CoCo.)

You can see that if you were to change the reset vector to your own program, and made sure that $71 contained $55, then, if someone were to press the Reset button, control of the computer would not return to the user's program, but rather the program pointed to by the reset vector. This is how a program can come back after you press the Reset. NOP is the first byte to which the reset vector must point. That is $12, 18 in decimal. That is another condition of a warm start. The BASIC ROM checks for that.

Now that we know what the computer does when we hit the Reset button, how do we change these conditions to suit our own needs? Well, it's simple, in theory anyway. What if we were to deny the CPU access to that particular byte ($71)? If the computer could not read or write to that byte, then when it made its test, it would never see $55 and always do a cold start. So much for theory, this is the real world. The makers of the Color Computer were kind (or smart) enough to put a "MEMORY DISABLE" or better known as the SLEND pin, on the 40-pin bus connector. This pin is normally high (five volts), and when some device or other pulls it low (0 volts), all forms of memory chips (ROM, RAM and PIAs) are disabled. I will be using this pin in conjunction with my circuit to deny access to memory location $71 to the CPU.

The actual circuit is in Figure 1 and the parts list is in Table 1. Some of these parts are not available at your local Radio Shack. You will have to go to a more specialized electronic store or to a mail order store like Active Electronics or JDR Electronics. You can get a complete parts kit from RGS Micro Inc. Just ask for the "Turn of the Screw" hardware kit # 1. The USA order line is 800-361-4970 and the Canadian line is 800-361-5338. Also look in this magazine for their ad. The chips used in this circuit are called CMOS (Complementary Metal Oxide Semi-conductor) chips and they are quite delicate. The slightest static charge can permanently damage the chip. The shock you receive from rubbing your feet on a carpet is enough to kill a CMOS chip if you were to come in contact with it. Make sure you and your work are grounded before you plug the chips into their sockets. Leave the chips in their original package until you are ready to plug the computer in.

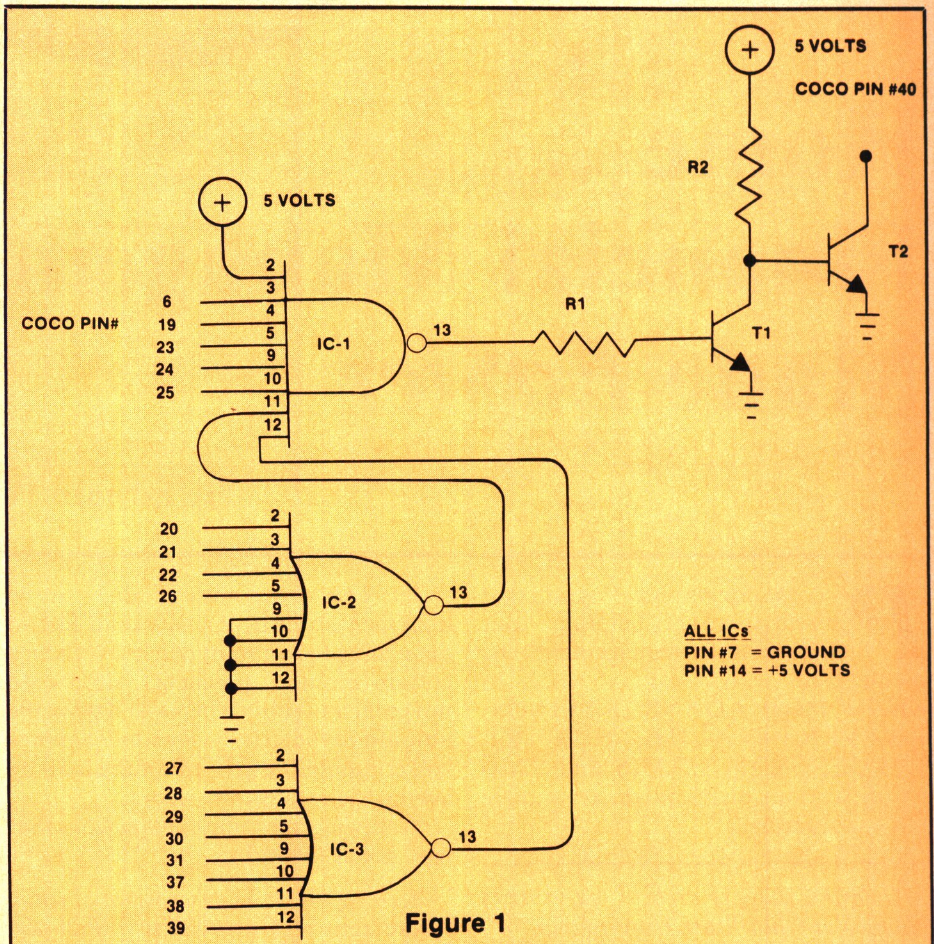
The construction is simple. The regular Tool Kit will do. Just connect the wires to the right points. The Proto-Board I like to use is made by RGS Micro. There are three capacitors in this circuit, used for power supply decoupling. Place them close to each chip on the board. As usual, clean the board after all is done. Place the switch where it is easily accessed. If you have a Multi-Pak Interface like I do, it is better to mount the switch upside down. This circuit will work for any board version (CoCo 2 also) except the "F" board; a small modification to this computer version is needed. If you have this board, open the computer and cut a capacitor. It is labeled C77. This capacitor is tied to the SLEND line and ground. Cutting this capacitor should not interfere with the normal operation of the computer.

Forcing a cold start is now quite easy. Hold down the switch with one hand. Hit and release the Reset button with the other. When the computer returns to power on condition, release the switch, it's as easy as that. Any time you don't want a cold start (a normal reset), just don't hold down the switch and you will get a normal reset condition.

NOTE: There is an error in last month's "Halt Pin And Its Functions" schematic. Pin #8 should read Pin #6 and a Pin #8 go ground should be added.

Table 1
Parts List

Quantity	ID #	Description	RS Part#
1	IC-1	CD4068	N/A
2	IC-2,3	CD4078	N/A
1	R-1	1000 OHMS ¼W	271-1321
1	R-2	100 OHMS ¼W	271-1311
2	T-1,2	MPS3904 or MPS222A	276-2016 276-2009
3	C-1,2,3	.1 uF CAPACITOR	272-1053
3	-	14 PIN SOCKETS	276-1999
1	-	PROTO-BOARD	N/A



ALL ICs
PIN #7 = GROUND
PIN #14 = +5 VOLTS

Figure 1
Hardware Cold Start

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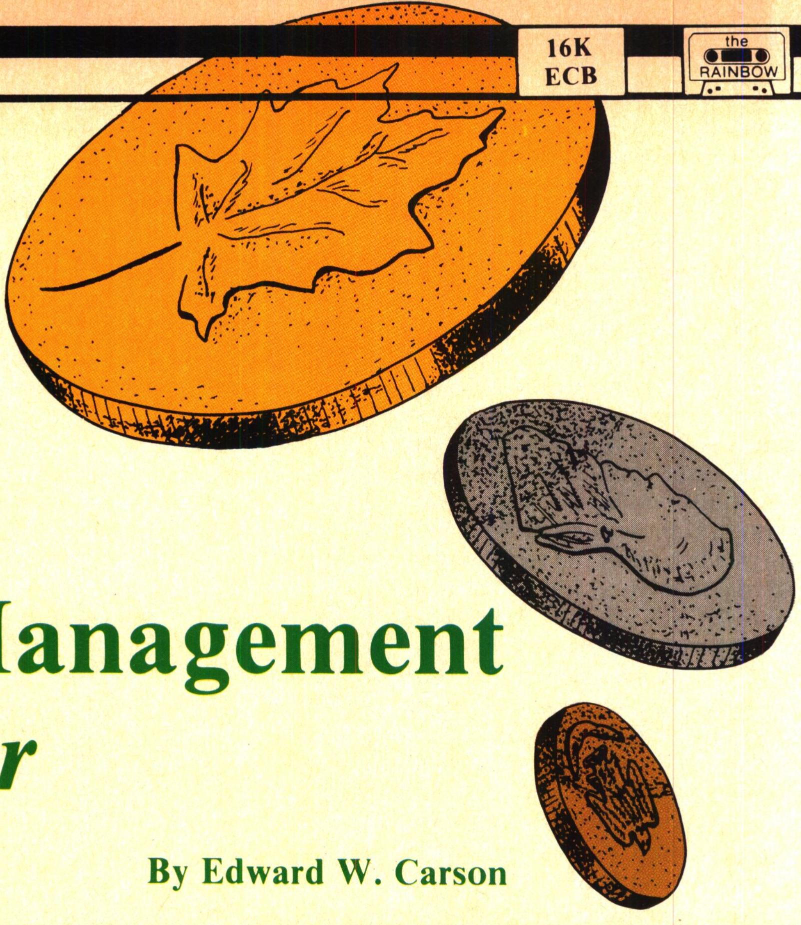

Home Financial Management Made *Ea$ier*

By Edward W. Carson

Personal Savings is a program that should prove very helpful in your home financial management. The menu gives four financial areas to choose from: LOANS, SAVINGS, PRESENT VALUE, FUTURE VALUE, and the LOANS and SAVINGS sections of the menu are mostly self-explanatory.

(Edward Carson is a senior majoring in finance at Ohio State University.)

The only thing not explained in the documentation is, if you would like to determine the amount of a loan (given a certain monthly payment), simply do not enter a number when asked what the amount of the loan is. *Personal Savings* will compute the amount of the loan by asking the monthly payment.

Following are some explanations that may prove helpful.

Present value: Today's value of some future return. Government bonds are sold at a discount according to their present value.

> Example: With a current interest rate of 10 percent, a $1,000 bond which matures one year from today would be worth $900 today.

Future value: Value of an investment at some point in the future.

> Example: $100 invested today at 10 percent interest will be worth $110 one year from today.

80	218
280	254
430	33
690	110
950	86
1120	45
END	98

The listing:

```
1 FORX=1022TO1335
2 POKEX,195
3 NEXTX
4 FORX=1336TO1535
5 POKEX,195
6 NEXTX
7 PRINT@168,"PERSONAL SAVINGS"
8 FOR Y=1208TO1215
9 POKEY,195:NEXTY
10 PRINT@238,"BY"
11 FORD=1264TO1279
12 POKED,195
13 NEXTD
14 PRINT@328,"EDWARD W. CARSON"
15 FORT=1368TO1375
16 POKET,195
17 NEXTT
20 FORS=1TO700:G=G:NEXTS
30 CLS:FORX=1022TO1119
31 POKEX,195
32 NEXTX
40 FORX=1440TO1600
41 POKEX,195
42 NEXTX
```

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ADVENTURE IN WONDERLAND — This 32K machine language adventure was THE most popular program for five months. If you don't have it, you have missed the best adventure experience available on your computer. Tape - **$24.95** Disk - **$29.95**

COLOR DISK TRIVIA — A great game for 1 to 4 players, this game has been a sensation since it was introduced. It became our #1 program in less than a week, and for good reason. This trivia game has 1100 questions in 5 categories — a FULL disk. It is really fun and challenging to play, and you can develop your own question disks easily with the included software. This program is already in use in many schools, but if you just like trivia, you will be interested to know that we have additional question disks available with 1100 questions on each one. We have a disk of Bible questions, sports questions, entertainment questions, and questions for children (8-15). The game, with 1100 questions and the question development program is **$29.95.** The additional question disks are **$19.95 each.**

GRAVITOR — A new machine language arcade game for the Coco that needs only 16K of **RAM,** and yet gives you 16 levels of play, 10 high-res playing screens in color, multiple voice music, and a practice mode. Fly from planet to planet (each one different), and see if you can destroy the enemy bases, or challenge the twisting passage to the reactor on the death base. No joysticks needed. **AWESOME!!** Tape - **$24.95** Disk - **$29.95**

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```
50 PRINT@135,"1) PRESENT VALUE"
60 PRINT@199,"2) FUTURE VALUE"
70 PRINT@263,"3) LOAN PAYMENTS"
80 PRINT@327,"4) SAVINGS"
89 GOTO90
90 INPUTA:IFA>4GOTO50
91 IFA=2GOTO190
92 IFA=3GOTO780
93 IFA=4GOTO380
94 IFA=1GOTO1000
100 FORX=1376TO1407:POKEX,220:NE
XTX
101 PRINT@448,"TO RETURN TO MENU
 PRESS enter"
102 INPUTQ$
110 Q$="INKEY$":IF"INKEY$"="<ENT
ER>"GOTO50
120 GOTO30
190 CLS:PRINT@65,"  FUTURE VALUE
 OF A DOLLAR"
200 FORD=1120TO1151:POKED,220:NE
XTD
210 PRINT@160,"HOW MUCH MONEY IS
 INVESTED":INPUTM
220 PRINT"HOW MANY YEARS":INPUTN
230 PRINT"WHAT IS THE INTEREST R
ATE":INPUTI
240 IF I<1GOTO360
250 PRINT"HOW MANY TIMES PER YEA
R":PRINT"IS THE INTEREST COMPOUN
DED":INPUTY
260 IB=I/Y:N=N*Y:IB=IB/100
270 C=1+IB
280 C=C^N
290 FV=C*M
300 N=N/Y
310 CLS:PRINT@98,"DOLLARS INVEST
ED":PRINT@116,USING"$#######,";M

320 PRINT@162,"INTEREST RATE":PR
INT@186,I;:PRINT" %"
330 PRINT@226,"NUMBER OF YEARS":
PRINT@250,N
340 PRINT@290,"FUTURE VALUE":PRI
NT@309,USING"$####,###.##";FV
350 GOTO100
360 CLS:PRINT@228,"PLEASE STATE
INTEREST RATE       AS A VALUE GR
EATER THAN ONE":INPUTI
370 GOTO250
380 CLS:PRINT@65,"SAVINGS"
390 FORX=1120TO1151:POKEX,220:NE
XTX
400 PRINT@160, "PLEASE CHOOSE"
410 PRINT:PRINT"1) HOW MUCH TO R
EGULARLY SAVE":PRINTTAB(4)"TO RE
ACH GIVEN GOAL"
420 PRINT:PRINT"2) WITH REGULAR
SAVINGS OF":PRINTTAB(4)"X DOLLAR
S HOW MUCH CAN" :PRINTTAB(4)"BE
SAVED WITHIN A":PRINTTAB(4)"SPEC
IFIC TIME PERIOD" :INPUTPP: GOTO
 720
430 CLS:PRINT:PRINT"WILL SAVINGS
 BE IN MONTHLY(M)":PRINT"OR WEEK
LY(W) INCREMENTS":INPUTL$
440 IFL$="M"GOTO730
450 IFL$="W"GOTO740
460 PRINT:PRINT"HOW MANY ";L$:IN
PUTY
470 IF PP=1 GOTO510
480 PRINT:PRINT"HOW MUCH WILL YO
U SAVE":PRINT"EACH MONTH (WEEK)"
490 INPUTA
500 GOTO520
510 PRINT:PRINT"WHAT IS YOUR SAV
INGS GOAL":INPUTM
520 PRINT:PRINT"WHAT IS THE INTE
REST RATE":INPUTI
530 IFI<1GOTO690
540 I=I/N:I=I/100
550 N=N*Y
560 C=(1+I)^Y:C=C-1
570 R=C/I
580 IF PP=1 GOTO610
590 M=A*R
600 GOTO620
610 A=M/R
620 I=I*100:N=N/Y:I=I*N
630 CLS:PRINT@99,"TOTAL SAVINGS"
:PRINT@117,USING"$####,###.##";M
640 PRINT@163,L$:PRINT@170,"TO S
AVE":PRINT@185,Y
650 PRINT@227,"INTEREST RATE":PR
INT@249,I;"%"
660 GOTO750
670 PRINT@291,L$:PRINT@300,"SAVI
NGS":PRINT@312,USING"$#####.##";A

680 GOTO100
690 CLS:PRINT@228,"PLEASE STATE
INTEREST RATE":PRINT@260,"AS A V
```

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```
ALUE GREATER THAN ONE" :INPUTI
700 GOTO540
710 INPUTPP
720 GOTO 430
730 L$="MONTHS":N=12:GOTO460
740 L$="WEEKS":N=52:GOTO460
750 IFL$="WEEKS"THENL$="WEEKLY"
760 IFL$="MONTHS"THENL$="MONTHLY
"
770 GOTO670
780 CLS:PRINT@68,"LOAN PAYMENTS"
790 FORX=1120TO1151:POKEX,220:NE
XTX
800 PRINT@160, "HOW MUCH IS LOAN
 FOR":INPUTPV
810 PRINT:PRINT"HOW MANY MONTHS"
:INPUTM
820 PRINT:PRINT"WHAT IS THE INTE
REST RATE":INPUTK
830 IFK<1GOTO960
840 K=K/12:K=K/100
850 C=(1+K)^M:C=C-1
860 D=(K+1)^M:D=D*K
870 C=C/D
880 IFPV=0 GOTO980
890 A=PV/C
900 K=K*12:K=K*100
910 CLS:PRINT@98,"AMOUNT OF THE
LOAN":PRINT@119,USING"$#######,";
PV
920 PRINT@162,"NO. OF MONTHS":PR
INT@ 186,M
930 PRINT@226,"INTEREST RATE":PR
INT@248,K;" %"
940 PRINT@290,"MONTHLY PAYMENTS"
:PRINT@311,USING"$#####.##";A
950 GOTO100
960 CLS:PRINT@228,"PLEASE STATE
INTEREST RATE        AS A VALUE GR
EATER THAN ONE":INPUTK
970 GOTO840
980 PRINT:PRINT"WHAT ARE THE MON
THLY PAYMENTS":INPUTA
990 PV=A*C:GOTO 900
1000 CLS:PRINT@65,"PRESENT VALUE
 OF A DOLLAR"
1010 FORT=1120TO1151:POKET,220:N
EXTT
1020 PRINT@160,  "WHAT IS THE FU
TURE RETURN        EXPECTED":INPU
TR
1030 PRINT:  PRINT "WHAT IS THE
INTEREST RATE":INPUTI
1040 PRINT: PRINT "HOW MANY YEAR
S BEFORE THE         RETURN IS EX
PECTED":INPUTY
1050 IFI<1GOTO1170
1060 I=I/100
1070 C=(1+I)^Y
1080 C=1/C:PV=R*C
1090 I=I*100
1100 CLS:PRINT@66,"EXPECTED"
1110 PRINT@98,"FUTURE RETURN":PR
INT@117,USING"$#######,";R
1120 PRINT@162,"INTEREST RATE":P
RINT@186,I;" %"
1140 PRINT@226,"YEARS TO MATURIT
Y":PRINT@250,Y
1150 PRINT@290,"PRESENT VALUE":P
RINT@309,USING"$###,###.##";PV
1160 GOTO100
1170 CLS:PRINT@228,"PLEASE STATE
 INTEREST RATE        AS A VALUE G
REATER THAN ONE":INPUTI
1180 GOTO1060
1190 PRINT@384,STRING$(32,"*")
1200 PRINT@421,"DO YOU WISH TO"
1210 PRINT@453,"CONTINUE (Y OR N
)"
1220 INPUTQ$
1230 K=I=M=N=IB=A=PV=C=D=R=0

1240 IFQ$="Y"GOTO10
1250 IFQ$="N" GOTO1270
1260 GOTO1190
1270 CLS(3):END
1480 *12
```

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PIPELINE

A NEW TANDY MODEL, the long-awaited and much-rumored IBM compatible, has arrived. Officially named the Tandy TRS-80 Model 1200, this machine is said to function identically to the popular IBM PC/XT.

The only Tandy 1200 configuration offered will be a 256K RAM, 360K floppy disk, and 10-meg hard disk system unit and keyboard for $2,995. Monochrome or color displays and adapters will be offered at an additional price. MS-DOS, the disk operating system, is also sold separately. While Tandy includes MS-DOS with its advanced Model 2000, it is keeping true to IBM's form by not including it in the 1200's price.

* * *

TAKING A BRIEF LOOK at the consumer information services this month, subscribers to The Source may be interested to learn that Ross Jones, treasurer of The Reader's Digest Association, Inc., has been elected chairman of the board of Source Telecomputing Corp. STC, located in McLean, Va., has also announced two new services available for the 60,000 members of The Source Information Network: an Official Airline Guide and worldwide Accu-Weather forecasts. The Official Airline Guide allows members to search through a database of flight schedules and fares, comparing such things as aircraft type, meal service, number of stops and limitations. And with the Accu-Weather database, updated four times daily, members will be able to gather current weather conditions and three-day forecasts from around the world.

Along the phone line at CompuServe, the news is that they, also, are adding two new databases. One, named Disclosure II, is an addition to their Executive Information Service. This service provides information on companies from the American, Over the Counter and New York Stock Exchanges covering company descriptions, financial information, income and balance sheet data, corporate officers' and directors' names and annual remuneration, subsidiary information, and the full text of management decisions. In conjunction, the Disclosure/Spectrum database lists detailed ownership information of more than 5,000 companies.

As an aside, some of you may be interested in CompuServe's database named "The World of Lotus," a new users' forum for subscribers using software developed by the Lotus Development Corp.

* * *

ADVENTURE CONTEST UPDATE. The slow, laborious process of judging the huge number of entries in the Second Annual RAINBOW Adventure Contest continues. The judges have been working feverishly night and day (and that's no exaggeration) to make their way through each entry and select the top 20 — those chosen few who will make it into the RAINBOW Book of Adventures.

There are so many exceptional entries this year that it has been difficult pruning the contenders down to a manageable number. If only a few had stood out from the pack, the selection process would have been much simpler, but a lot of THE RAINBOW'S Adventure programming readers have grown remarkably sophisticated.

Hold onto your Indiana Jones fedoras, though; next month, the Adventure begins. The December issue of THE RAINBOW will contain one or two of the finest entries, and we think you'll agree that they were well worth the wait.

* * *

JOINING THE MASTERS. Entries are currently being sought for the Bronx Museum of the Arts exhibition of works by artists who use computers as expressive tools. Such works as computer graphics, computer animation, sound installations and audio art, among others, are eligible.

Videotape submissions must be on three-quarter inch or VHS formats and slides must be 35 mm. The deadline for all entries is December 20, 1984, and you are requested to send duplicates only, accompanied by a SASE. The museum claims no responsibility for original works.

If you're interested in exhibiting one of your creations, send it to the Computer Graphics Exhibition, Bronx Museum of the Arts, 1040 Grand Concourse, Bronx, NY 10456; phone (212) 681-6000.

* * *

MICHTRON ON THE MOVE. MichTron, the producer of several products for the Color Computer, has expanded its operation and moved into a large, new complex. With this move, not only do they expect to have a bit more elbow room, but they should also be better able to serve their customers.

MichTron's new address is 576 S. Telegraph Road, Pontiac, MI 48053; phone (313) 334-6576.

* * *

ECHO, which stands for Electronic Communications for the Home and Office, is a new electronic mail and conferencing service being offered by Budget Time-Share of Marina Del Rey, California. What makes this communications network different is their flat rate of $10 per month with unlimited access.

Besides electronic mail, ECHO's services include interactive conversations (either one-to-one or in conference), automatic transcripts of conference calls, bulletin boards, databases and users' forums. In the future they expect to offer employment listings, classified advertising and electronic shopping.

For more information about ECHO and their services, contact them at 4739 Alla Road, Marina del Rey, CA 90291; or call Elliot Pressman at (213) 823-8415.

* * *

PEEKS, POKES AND EXECS are covered exclusively in a new book recently published by Microcom Software. *500 POKEs, PEEKs 'n EXECs for the TRS-80 Color Computer* contains information on these commands that perform functions such as auto-starting BASIC programs, restarting BASIC programs with the Reset button, transferring ROM packs to tape, disabling the BREAK key and Reset buttons, and others.

The book is available for $16.95, plus $2 shipping and handling charges. To purchase a copy, write to Microcom Software, P.O. Box 214, Fairport, NY 14450; or call (716) 223-1477.

* * *

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FEATURES and COMMANDS -	RS DOS	SPECTRUMDOS
Auto Disk Search - Search all drives for files	NO	YES
MEMO - Full screen editor and screen dump	NO	YES
AUTO - Automatically adds line numbers	NO	YES
HIRES - Choice of 32, 51 or 64 characters	NO	YES
ON ERROR GOTO - Traps all errors	NO	YES
RUNM - Load & Exec ML files automatically	NO	YES
ECHO - Output to screen and printer	NO	YES
Supports 35-80 TRKs, 6ms-30ms & DS/DD	NO	YES

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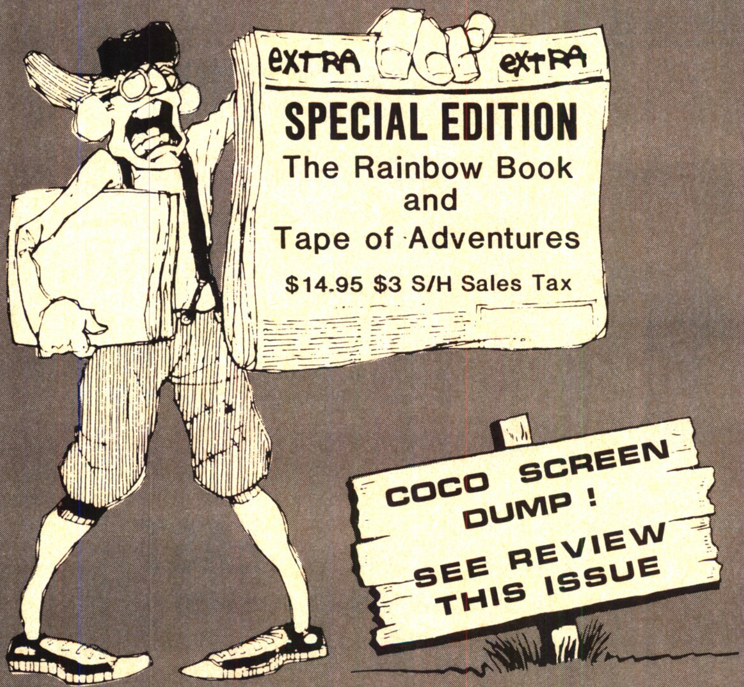
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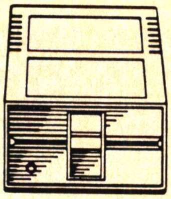

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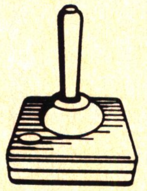

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16K
DISK

A Special Use For
The DOS Command

By Roger Schrag
Rainbow Contributing Editor

The newer Color Computer disk drive systems have a command not found on the older systems. This is the DOS command. You type in DOS to load the OS-9 Disk Operating System.

When you type in the DOS command, the computer reads the entire contents of track 34 on the diskette in drive zero. The computer assumes that track 34 contains a special machine language program which will load and initialize the OS-9 system. However, we can put just about any machine language program on track 34 and have it automatically executed whenever we enter the DOS command.

Auto Start On DOS, or *DosStart* for short, is a BASIC program shown in the listing. *DosStart* lets you type in a BASIC command line up to 255 characters long. It then writes a special machine language program onto track 34 of your diskette so that whenever you type DOS with this diskette in drive zero, your command line of up to 255 characters will be executed, exactly as if you had just entered this command line from the keyboard.

For example, suppose you have a word processing disk and follow this procedure whenever you want to do some word processing: First, turn on your system. Then insert your diskette in drive zero. Next, *POKE* in your printer's special Baud rate. Then turn *VERIFY ON*. Next, *LOADM* your word processor. Finally, you *EXEC* it.

By using what *DosStart* has to offer, you could make this procedure much simpler: Simply turn your system on, insert your diskette in drive zero, and type DOS. Now the computer will read in the special program that *DosStart* put on track 34, and the computer will execute all of those other commands (the *POKE, VERIFY ON,* etc.) without having to type anything on the keyboard.

DosStart puts the special machine language program to be read by DOS onto the first two sectors of track 34. In the disk directory, this space will appear to be allocated to a file named *DOS BOOT/DAT*. Do not attempt to *LOAD* or *LOADM* this file, because the data is written in a special format which isn't loaded by normal procedures.

If the required portion of track 34 is already allocated to a program on your diskette, you will be informed of this and the procedure will be canceled.

DosStart may be used to make complex initialization procedures simpler and quicker. Your command line may be something as simple as *RUN"PAYROLL"* or something as fancy as:

```
CLS(7):DRIVE 1:PRINT"FILE
DIRECTORY - DRIVE 1":DIR:
VERIFY ON:POKE 282,0:PRINT
"HIT (ENTER) TO START";:FOR
X=1 TO 32767: IF INKEY$=CHR$
(13) THEN LOADM"MAILLIST":
EXEC:ELSE NEXT X
```

If you decide at a later time to disable the DOS procedure so that you may use that disk space for another program, simply enter *KILL"DOS BOOT/DAT"*.

This is one handy little program that you may have to play around and experiment with to fully understand its capabilities. One limitation: Your command

---

(Roger Schrag, currently studying computer science at the University of California at Berkeley, enjoys working with the CoCo and writing articles for THE RAINBOW. *He also designs and translates programs for Adventure International.)*

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see NOV'83 Rainbow Review

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line may not contain the *INPUT* statement.

If you have any questions or comments, you may reach me at 2054 Manning Avenue, Los Angeles, CA 90025. Due to the high volume of mail I receive, I will not be able to send you a reply unless you include a self-addressed, stamped envelope.

The listing:

```
1 CLEAR 1000:CLS
2 PRINT"AUTO START ON 'DOS'"
3 PRINT"==================="
4 PRINT
5 PRINT"ENTER ANY COMMAND THAT"
6 PRINT"YOU WOULD LIKE TO BE"
7 PRINT"EXECUTED UPON TYPING"
8 PRINT"IN 'DOS':"
9 LINEINPUT B$
10 B$=B$+STRING$(255-LEN(B$),0)
11 FOR X=1 TO 64:READ N$
12 N=VAL("&H"+N$)
13 A$=A$+CHR$(N):CK=CK+N:NEXT
14 IF CK<>5775 THEN 39
15 A$=A$+STRING$(191,0)
16 PRINT"INSERT TARGET DISK AND'
17 LINEINPUT"PRESS ENTER ";N$
18 DSKI$ 0,17,2,C$,D$
19 N$=MID$(C$,67,1)
20 IF N$<>CHR$(255) THEN 43
21 E$=STRING$(66,201)+CHR$(255)
22 F$=STRING$(128,255)
23 DSKO$ 0,17,2,E$,F$
24 OPEN"D",1,"DOS BOOT"
25 PRINT#1,A$;CHR$(0);:PUT#1,1
26 PRINT#1,B$;CHR$(0);:PUT#1,2
27 CLOSE:MID$(C$,67)=CHR$(201)
28 DSKO$ 0,17,2,C$,D$
29 PRINT"FUNCTION COMPLETE"
30 END
31 DATA 4F,53,00,00,CE,01,6A,37
32 DATA 12,B7,26,3C,BF,26,3D,8E
33 DATA 26,1D,BF,01,6B,DC,8A,FD
34 DATA 26,00,7E,AC,7C,0F,70,AF
35 DATA E4,BE,26,3F,A6,80,BF,26
36 DATA 3F,4D,26,0E,B6,26,3C,BE
37 DATA 26,3D,B7,01,6A,BF,01,6B
38 DATA 86,0D,35,90,00,00,00,27
39 PRINT"CHECKSUM ERROR --"
40 PRINT"YOU HAVE ENTERED A"
41 PRINT"DATA LINE INCORRECTLY"
42 END
43 PRINT"THE REQUIRED PORTION"
44 PRINT"OF THE DISK IS BEING"
45 PRINT"USED BY A PROGRAM"
46 PRINT"ALREADY ON THE DISK"
47 END
```

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Cooking With CoCo

PART V

By Colin J. Stearman

In which the CoCo kitchen will cook up something SLOW, FAST, and COLD.

It's time we got down to some BASIC cooking and add the code for many of the new commands.

New BASIC Commands

When you add the assembly language in Listing 1 to last month's listing (I will tell you how to do this shortly), it will add the following commands and functions:

COLD

This is a Reset command from the keyboard. When you issue it, any program in memory will be lost and BASIC will be "cold" started. This is useful if you have corrupted BASIC somehow and it performs exactly the same as entering the BASIC command *POKE &H71,0:EXEC&HA027*. The start-up banner will be displayed and the *AUTOEXEC.BAS* file will be run.

(Colin J. Stearman is an electronics engineer educated in the U.K. He has worked with all kinds of computers and has been a CoCo enthusiast for over two years.)

WPOKE

This is like *POKE*, but is WORD oriented instead of byte. The syntax is the same as *POKE*, but the value can be anything from zero to 65535. This number is poked into the given address and the next address location.

FAST

Issuing this command puts CoCo into high gear and is exactly the same as *POKE65495,0*. You can run the disk system in the FAST mode if you remove capacitor C85 from the mother board. This is a 220pF capacitor on the "Cartridge Select Signal" at pin 32 socket and ground. A word of warning though: do not attempt any disk input/output while in the FAST mode, because it will surely fail!

SLOW

No prizes for guessing what this one does; it issues the equivalent of *POKE 65494,0* and should be performed whenever a FAST has been issued and disk input/output is required.

XEQ(M)

If you type in *XEQ"GAME"*, it is exactly the same as entering *RUN*

"GAME"; in other words the BASIC program *"GAME.BAS"* is retrieved from the disk and run. However, if you enter *XEQM"GAME"*, then the machine code program *"GAME.BIN"* will be loaded from disk and started up. It's equivalent to entering *LOADM"GAME":EXEC.*

AUTO

This "direct only" command automatically generates BASIC program line numbers. If you just enter AUTO then the first line will be 10 and the increment will be 10. If you enter *AUTO 100*, for example, the first line number generated will be 100, with an increment of 10. If you enter *AUTO 4,2* the first line number will be four with an increment of two. To exit the AUTO mode, either press BREAK or ENTER immediately after the line number.

SCAN$

SCAN$ is a function similar to *INKEY$*. Its syntax is the same. However, SCAN$ will wait for a key to be pressed rather than continuing on like *INKEY$*. So, if you have a program Line *100 A$=SCAN$*, the program will wait at Line 100 until a key is pressed, and the key value will be assigned to A$.

DATE$

This string function will return the current date stored in the computer. The format of the date is mm/dd/yy, for example 06/12/84. It is always eight characters long. You can use DATE$ like any other string variable, including assigning it to another string variable with an "equals" statement, or manipulating it with MID$, LEFT$, etc. However, you cannot assign a new string value to it by having it on the left side of an equals sign.

Once this code has been added we can "uncomment" some lines from last month (details below), and the *DIR* command will now pause after the screen fills, awaiting any key to continue. Also, the creation date of each file will be displayed in the directory.

Listing 2 is a BASIC program called *"DATESET.BAS"* which sets the date and also dates any undated files on the disk. Files created before you patched BASIC can be dated this way and also any files created by machine language programs which do not use BASIC to open them. Files will be dated if their date fields in the directory contain $0000 or $FFFF. Files with legitimate dates will not be changed. I have this file on my main editor disk and renamed it *"AUTOEXEC.BAS"* so it runs everytime I start up.

WPEEK

This is the complement of WPOKE and will return the WORD stored at the given address and the next consecutive address. The value returned is in the range zero to 65535. The syntax is the same as for *PEEK*.

Adding The New Functions

Call in last month's listing and make the following changes using the [REF #] given as a locating guide. Remove the commenting asterisk from reference Lines 3 and 5. Then delete reference Lines 12 through 17, 23, 24 and 28. Also, delete the last four lines of last month's listing starting with the line *"ZZLAST EQU *-1"*, as these are in this month's listing.

Now type in the new assembly language code found in Listing 1. Finally, reassemble the result and try it as you did last month's listing. The commands and functions should all work as advertised. If not, double check all your typing or subscribe to RAINBOW ON TAPE!

Coming Next Month

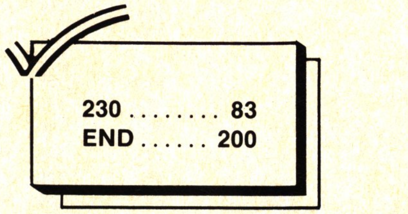
The next installment will be devoted entirely to the construction of the parallel interface and the software to integrate it into BASIC. So clean up the CoCo kitchen and we'll go to it next month.

If you would like the entire *DOS PATCH* program source, along with binary files with and without the parallel port driver for DECB 1.0 and DECB 1.1, just send me a disk (no cassettes please) along with $6 and a stamped, addressed disk mailer. I will load the disk and return it to you promptly. Address this request or any questions to: Colin Stearman, 143 Ash Street, Hopkinton, MA 01748.

Listing 1:

```
>>>UNKNOWN MNEMO---
               0917        OPT   LIS
               0918 ******************************************
               0919 *  PATCH #3 to RSDOS (C)1984 Colin Stearman *
               0920 ******************************************
               0921 *
               0922 ****************************************
               0923 *  "COLD" performs a cold restart
DB56 0F71      0924 COLD   CLR   $71         RESET COLD FLAG
DB58 7EA027    0925        JMP   $A027       RESTART BASIC
               0926 ***********************
               0927 * "WPOKE" COMMAND
DB5B BDB73D    0928 WPOKE  JSR   $B73D       GET 1ST ARGUMENT 0 TO FFFF
DB5E 9F2B      0929        STX   $2B         & SAVE TEMPORARILY
DB60 BDB26D    0930        JSR   $B26D       PARSE OVER REQUIRED COMMA
DB63 BDB73D    0931        JSR   $B73D       GET SECOND ARGUMENT
DB66 AF9F002B  0932        STX   [$2B]       DO DOUBLE POKE
DB6A 39        0933        RTS               RETURN TO BASIC
               0934 ***********************
               0935 *  "FAST"
               0936 *
DB6B B7FFD7    0937 FAST   STA   65495       SPEED UP PROCESSOR
DB6E 39        0938        RTS
               0939 ********************
               0940 *      "SLOW"
               0941 *
DB6F B7FFD6    0942 SLOW   STA   65494       SLOW DOWN PROCESSOR
DB72 39        0943        RTS
               0944 ********************
               0945 * "XEQ" COMMAND
DB73 814D      0946 XEQ    CMPA  #'M         XEQM?
DB75 2703      0947        BEQ   XEQM        YES
DB77 7EAE75    0948        JMP   $AE75       NO - SAME AS RUN
DB7A BDCEE5    0949 XEQM   JSR   A0021       DO LOADM
DB7D 7FFF40    0950        CLR   $FF40       STOP DRIVE MOTOR
DB80 6E9F009D  0951        JMP   [$9D]       EXEC
               0952 ************************************
               0953 * "AUTO n,i"
               0954 *
DB84 BDD81B    0955 AUTO   JSR   DIRECT      CURRENT BASIC LINE #
DB87 2668      0956        BNE   SYNERR      SYNTAX ERROR
DB89 CC000A    0957        LDD   #$0A        DEFAULT LINE #
DB8C FD01D1    0958        STD   LINNUM      SAVE IT
DB8F FD01D3    0959        STD   INCNUM      SAVE IT FOR INCREMENT TOO
DB92 9DA5      0960        JSR   <$A5        ANY MORE ON LINE?
DB94 271D      0961        BEQ   NOMORE
DB96 BDB73D    0962        JSR   $B73D       EVALUATE ARGUMENT
DB99 DC52      0963        LDD   <$52        GET IT IN D
DB9B FD01D1    0964        STD   LINNUM      OVERRIDE DEFAULT LINE #
DB9E 9DA5      0965        JSR   <$A5        ANY MORE VALUES?
DBA0 2711      0966        BEQ   NOMORE
DBA2 BDB26D    0967        JSR   $B26D       PARSE COMMA
DBA5 BDB73D    0968        JSR   $B73D       EVALUATE IT
DBA8 DC52      0969        LDD   <$52        GET IT IN D
DBAA 2745      0970        BEQ   SYNERR      CANNOT BE ZERO
DBAC FD01D3    0971        STD   INCNUM      OVERRIDE DEFAULT
DBAF 9DA5      0972        JSR   <$A5        ANY MORE ON LINE?
DBB1 263E      0973        BNE   SYNERR      ERROR IF SO
```

```
DBB3 86FF       0974 NOMORE LDA   #$FF        SET UP AUTO FLAG
DBB5 B70149     0975        STA   AUTOFG
DBB8 39         0976        RTS               ALL DONE
                0977 ************************
                0978 * This is the trap routine to see if in
                0979 * AUTO mode
                0980 *
DBB9 7D0149     0981 INPUT  TST   AUTOFG      AUTO MODE?
DBBC 270C       0982        BEQ   INEXIT
                0983 *******
DBBE FC01D1     0984 DOAUTO LDD   LINNUM      GET LAST LINE NUMBER
DBC1 1083F9FF   0985        CMPD  #$F9FF      TOO HIGH?
DBC5 2304       0986        BLS   NOTHI
DBC7 7F0149     0987        CLR   AUTOFG      RESET FLAG
DBCA 39         0988 INEXIT RTS               RETURN
                0989 *
                0990 *******
DBCB 0F87       0991 NOTHI  CLR   $87         INKEY STORE
DBCD 0F70       0992        CLR   $70         FLAG BUFFER FLUSHED
DBCF EDE4       0993        STD   ,S          D SAVE CURRENT VALUE OVER RETURN
DBD1 F301D3     0994        ADDD  INCNUM      INCREMENT IT
DBD4 FD01D1     0995        STD   LINNUM      AND SAVE IT
DBD7 3506       0996        PULS  D           GET OLD VALUE OFF STACK
DBD9 BDBDCC     0997        JSR   $BDCC       DISPLAY NUMBER
DBDC 8620       0998        LDA   #$20        SPACE
DBDE BDA282     0999        JSR   CHROUT      DISPLAY IT
DBE1 CE03DA     1000        LDU   #$3DA       WHERE CONVERTED # IS
DBE4 8E02DD     1001        LDX   #BASBFR     POINT TO BASIC BUFFER
DBE7 5F         1002        CLRB              SET UP CHARACTER COUNTER
DBE8 A6C0       1003 ILOOP  LDA   ,U+         GET FIRST CHAR
DBEA 2708       1004        BEQ   GOTNUM      GET ALL NUMBERS
DBEC A780       1005        STA   ,X+         MOVE TO BUFFER
DBEE 5C         1006        INCB              COUNTER UP
DBEF 20F7       1007        BRA   ILOOP       CONTINUE
                1008 * JUMP IS HERE SO EVERYONE CAN GET IT WITHOUT
                1009 * LONG BRANCHING
DBF1 7EDA2F     1010 SYNERR JMP   SNERR
                1011 *
DBF4 8620       1012 GOTNUM LDA   #$20        SPACE
DBF6 A780       1013        STA   ,X+         SAVE IT AT BUFFER END
DBF8 5C         1014        INCB              COUNT IT
DBF9 BDA171     1015        JSR   $A171       READ A CHARACTER
DBFC 810D       1016        CMPA  #$0D        RETURN?
DBFE 2704       1017        BEQ   ENDAUT      END AUTO FUNCTION
DC00 8103       1018        CMPA  #$03        BREAK?
DC02 2609       1019        BNE   INDONE      NOT SPECIAL SO EXIT
DC04 7F0149     1020 ENDAUT CLR   AUTOFG      RESET FLAG
DC07 CC0D01     1021        LDD   #$0D01      GET A RETURN IN A, 1 CHR IN B
DC0A 8E02DD     1022        LDX   #BASBFR     POINT TO BUFFER START
DC0D 7EA39D     1023 INDONE JMP   $A39D       CONTINUE BASIC LOOP
                1024 **********************
                1025 *       "SCAN"
                1026 *
DC10 9687       1027 SCAN   LDA   $87         HAS A KEY BEEN PRESSED?
DC12 2605       1028        BNE   GOTKEY      YES, RETURN WITH CODE
DC14 BDA1C1     1029 KSCAN  JSR   $A1C1       NO CALL KEY SCAN
DC17 27FB       1030        BEQ   KSCAN       KEEP LOOKING
DC19 7EA56B     1031 GOTKEY JMP   $A56B       RETURN A 1 CHAR. STRING
                1032 ***********************
                1033 *
                1034 *       "DATE$"
                1035 *
DC1C C608       1036 DATE   LDB   #8          CHARACTERS IN MM/DD/YY
DC1E BDB50F     1037        JSR   $B50F       VERIFY SPACE AVLBLE, ALLOCATE
                1038 * X IS RETURNED WITH ADDRESS OF STRING START
DC21 8D03       1039        BSR   DATGET      PUT CURRENT DATE AT 8
DC23 7EB69B     1040        JMP   $B69B       EXIT VIA STRING$ CODE
                1041 *********
                1042 * DATGET PUTS MM/DD/YY AT ADDRESS IN X BASED UPON
                1043 * VALUE AT DATUM. DATE IS STORED AS FOLLOWS:
                1044 * 15 - 9           8 - 5   4 - 0
                1045 * YEAR (MOD1900)  MONTH    DAY
DC26 FC014E     1046 DATGET LDD   DATUM       GET DATA FOR MONTH
                1047 * ENTER BELOW WITH DATE ALREADY IN D
DC29 3406       1048 DATOUT PSHS  D           SAVE ON STACK
DC2B 44         1049        LSRA              GET UPPER BIT IN CARRY
DC2C 56         1050        RORB              MOVE DOWN
DC2D 54         1051        LSRB              MOVE DOWN
DC2E 54         1052        LSRB              MOVE DOWN
DC2F 54         1053        LSRB              MOVE DOWN
DC30 54         1054        LSRB              MOVE DOWN
DC31 8D16       1055        BSR   DECODE      PUT CHARACTERS IN BUFFER
DC33 862F       1056        LDA   #'/
DC35 A780       1057        STA   ,X+
DC37 E661       1058        LDB   1,S         GET DAY
DC39 C41F       1059        ANDB  #%00011111  MASK OFF MONTH
DC3B 8D0C       1060        BSR   DECODE
DC3D 862F       1061        LDA   #'/
DC3F A780       1062        STA   ,X+
DC41 E6E4       1063        LDB   ,S          GET UPPER BYTE
DC43 54         1064        LSRB              POSITION YEAR DATA
DC44 8D03       1065        BSR   DECODE      GET CHARACTERS IN A,B
DC46 3262       1066        LEAS  2,S         REMOVE DATE FROM STACK
DC48 39         1067        RTS
                1068 *
DC49 4F         1069 DECODE CLRA              SET UP TENS COUNTER
DC4A C00A       1070 SUBTEN SUBB  #10         REDUCE BY TEN
DC4C 2503       1071        BLO   GOTTEN      EXIT AS WENT NEG
DC4E 4C         1072        INCA              INCREMENT TENS
DC4F 20F9       1073        BRA   SUBTEN      CONTINUE SUBTRACTING
                1074 *
DC51 CB3A       1075 GOTTEN ADDB  #10+'0      RESTORE UNITS AND
DC53 8B30       1076        ADDA  #'0         TENS TO ASCII
DC55 ED81       1077        STD   ,X++        SAVE IN BUFFER
DC57 39         1078        RTS
                1079 ******************************************
                1080 *       "WPEEK"
                1081 *
                1082 *WPEEK RETURNS 2 BYTES
DC58 BDB740     1083 WPEEK  JSR   $B740       INTEGERIZE PARSED VALUE
DC5B EC84       1084        LDD   ,X          DO DOUBLE PEEK
DC5D DD52       1085 UNSIGN STD   $52
DC5F 7E880E     1086        JMP   $880E       SEND INSIGNED # TO VARIABLE
                1087 ************************
                1088
                1089
                1090
DC61            1091 ZZLAST EQU   *-1         last used address value
                1092 *
                1093 * ZZLAST must not be greater than $DFFF for
                1094 * DOS 1.0 and $DEFF for DOS 1.1.   The latter
                1095 * has the OS-9 Boot program and SWI set routines
                1096 * from $DF00 to $DF4C
                1097 *
                1098 *
                1107        OPT   LIS
D994            1108        END   ADDCOM
       NO ERROR(S) DETECTED
```



230 83
END 200

Listing 2:

```
5 '"DATESET.BAS"  LISTING #2 COO
KING WITH COCO- PART 5
10 CLEAR 1000
20 'DATE LOADER
30 DIM DAYS(12)
40 DATA 31,28,31,30,31,30,31,31,
30,31,30,31
50 FOR I=1 TO 12
60 READ DAYS(I)
70 NEXT
80 IF WPEEK(&H14E)<>0 AND WPEEK(
&H14E)<>&HFFFF THEN 210
90 INPUT"DATE(MM,DD,YY)";M,D,Y
100 IF M<0 OR M>12 THEN 240
110 IF Y<0 THEN 240
120 IF D<1 THEN 240
130 IF M=2 THEN 160
140 IF D>DAYS(M) THEN 240 ELSE 1
90
150 ' DO FEBRUARY
160 IF(INT(Y/4)<>Y/4)AND(D>DAYS(
M))THEN 240
170 ' LEAP YEAR
180 IF D>29 THEN 240
190 DATE =(Y*INT(2^9))+(M*INT(2^
5))+D
200 WPOKE &H14E,DATE
210 INPUT"DATE FILES";A$
220 IF LEFT$(A$,1)="Y" OR LEFT$(
A$,1)="y"  GOSUB 250
230 NEW
240 PRINT"ERROR":GOTO90
250 ' FILE REDATER
260 ' DATES ANY FILES WITH ZERO
OR 255
270 ' IN THE DATE FIELD WITH TOD
AYS DATE
280 INPUT"DRIVE NO";DR
290 PRINT"THESE FILES REDATED WI
TH          ";DATE$
300 IF DR<0 OR DR>1 THEN 280
310 FOR X= 3 TO 11
320 DSKI$ DR,17,X,A$,B$
330 A$=A$+LEFT$(B$,127)
340 FOR N=0 TO 7
350 FILE$=MID$(A$,N*32+1,8)
360 EXT$=MID$(A$,N*32+9,3)
370 IF ASC(FILE$)=0 THEN 450
380 IF FILE$=STRING$(8,255) THEN
FLAG=1:GOTO460
390 MSB=ASC(MID$(A$,N*32+17,1))
400 LSB=ASC(MID$(A$,N*32+18,1))
410 IF MSB=0 AND LSB =0 THEN 430
420 IF MSB<>255 OR LSB<>255 THEN
 450
430 MID$(A$,N*32+17,2)=CHR$(PEEK
(&H14E))+CHR$(PEEK(&H14F))
440 PRINTFILE$+"."+EXT$
450 NEXT N
460 B$=RIGHT$(A$,127)
470 A$=LEFT$(A$,128)
480 DSKO$ DR,17,X,A$,B$
490 IF FLAG=1 THEN 510
500 NEXT X
510 RETURN
```

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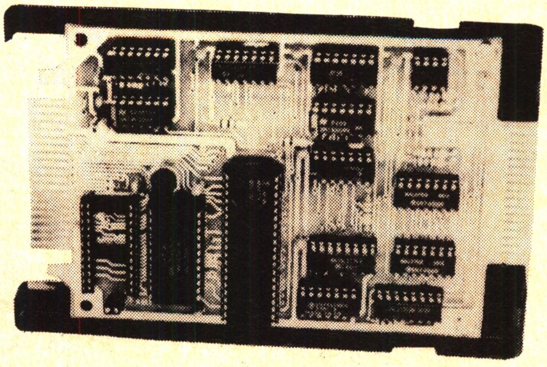

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Simple Programs: A Learning Experience For All

By Joseph Kolar
Rainbow Contributing Editor

Is there a newcomer to CoColand, who doesn't want to learn to program?

This article is addressed to the newcomer who has waded through the first 11 chapters of *Getting Started With Basic*. Except for *PLAY*, used in Listing 5, all the statements and functions will be familiar to you.

The project: Create a simple tutorial for pre-schoolers or first graders. The program will add two numerals and display the answer in a vertical format.

PRINTTAB allows us to locate the first character, or space, to be printed on a specified row. *PRINT@* allows us to locate the first character, or space, anywhere on the screen using the *PRINT@* screen location values.

Before we continue, let me assure you that plenty of errors were made during the construction of this program. There are lots of SNs, FCs, ULs and RGs. That is the way it goes! When you create, you make many errors. Note the nature of the error and the line number; try to correct it. If one thing fails to solve the problem you may have the right solution, but you may be inserting it in the wrong place in the listing.

Rest assured that this program was rife with mistakes. Imagine an error every couple of lines. However, let us pretend no mundane SNs or TMs, etc. were made.

Note the tendency to add a line or routine, only to discard or change it later. The original idea is constantly altered as you progress and see new possibilities.

Again, the plan was to add 2 + 3 = 5 using *PRINTTAB* and a vertical presentation. As we work our way through this creative session, try to anticipate what happens next. You need not key in any of the listings.

Put a fresh cassette in your recorder and fire up the computer. Read on and create with me.

Key in the following lines that add 2+3 and displays the answer. Remember, you may stop and *RUN* at any time to see what is what.

```
5  CLS
10 PRINTTAB(15)"2"
20 PRINTTAB(14)"+3"
30 PRINTTAB(14)"--  ;:INPUT A
50 PRINTTAB(14)A
```

Move down to center the screen display.

```
6 FOR Y =1 TO 5:PRINT:NEXT
```

Determine if the answer is correct and count each correct answer.

```
60 IF A=5 THEN X=X+1
```

Determine if the answer is wrong and repeat the problem.

```
61 IF A<>5 THEN GOTO 5
```

If the answer is correct, so state with a line of text. If we expect to present many problems, it is best to use a *GOSUB* routine to avoid the bother of keying in the same line over and over.

```
1000 PRINT@322, "YOU GOT"X" RIGHT SO FAR!"
```

(Joseph Kolar is a free-lance writer and programmer dedicated to proselytizing for computers in general, and the CoCo specifically.)

Every *GOSUB* requires a *RETURN*.

1030 RETURN

We must send the CoCo to the subroutine. Add to end of Line 60:

<:GOSUB 1000>

Also, we must tell the computer to go somewhere. Set up for another problem.

70 GOTO 2000

Make two copies of work in progress, *CSAVE"ADD"*.

In order to get to the next routine, we need an *INPUT* routine and clear the screen. We skip a row.

1010 PRINT:PRINT:INPUT"
PRESS <ENTER>";OA
1020 CLS

At this point, we need another problem routine. We take the routine, Lines 6-70 and beginning at Line 2000, keeping the same line number intervals, copy the routine, using three and one for the variable values in the new routine. We do this by *LIST* and using the new line numbers, copy Lines 6-70, from your monitor, changing the necessary variable values, for the display on the screen.

Remember to change the value of A in Lines 2050 and 2051 to the correct answer, four.

RUN. We find we forgot to clear the screen to re-attempt the problem. Insert at beginning of Line 2000 <*CLS:*>.

To make sure X is being tabulated correctly, we add a third problem. But, being nervous, we make sure that we start with zero correct answers:

4 X=0

Beginning at 3000, we copy the routine in the 2000 block, using two and two for the problem elements. We loop Line 2051 back to 2000 to re-try the problem if an incorrect answer is given.

To make sure that we flip to Line 4000, a little message is inserted to verify that we got there safely.

4000 PRINT"NEXT PANEL   PLEASE"

RUN. Input only correct answers; then input only incorrect answers; then a few incorrect answers and the right answer. Observe if the score is incremented properly.

Make two copies of work in progress *CSAVE"ADDA"*.

```
0 'ADDA
4 X=0
5 CLS
6 FOR Y=1 TO 5:PRINT:NEXT
10 PRINTTAB(15)"2"
20 PRINTTAB(14)"+3"
30 PRINTTAB(14)"--     ";:INPUTA
50 PRINTTAB(14)A
60 IF A=5 THEN X=X+1:GOSUB1000
61 IF A<>5 GOTO5
70 GOTO2000
1000 PRINT@322,"YOU GOT"X"RIGHT
SO FAR!"
1010 PRINT:INPUT"                  PRE
SS <ENTER>";OA
1020 CLS
1030 RETURN
2000 CLS:FOR Y=1 TO5:PRINT:NEXT
2010 PRINTTAB(15)"3"
2020 PRINTTAB(14)"+1"
2030 PRINTTAB(14)"--     ";:INPUTA
2040 PRINTTAB(14)A
2050 IF A=4 THEN X=X+1:GOSUB1000
2051 IF A<>4 THEN GOTO2000
2060 GOTO3000
3000 CLS:FOR Y=1 TO 5:PRINT:NEXT
3010 PRINTTAB(15)"2"
3020 PRINTTAB(14)"+2"
3030 PRINTTAB(14)"--     ";:INPUTA
3040 PRINTTAB(14)A
3050 IF A=4 THEN X=X+1:GOSUB1000
3051 IF A<>4 THEN GOTO2000
3060 GOTO4000
4000 PRINT"NEXT PANEL PLEASE."
```

Looking over the listing, we note that Lines 5 and 6; 2000; 3000; are the same. Rather than keying in this line every time we add a problem block, we decide to <DEL5-6> and create a subroutine.

60000 CLS:FOR Y = 1 TO 5   :PRINT:NEXT
60001 RETURN

Then we send each problem routine to the new subroutine.

6 GOSUB 60000
2000 GOSUB 60000
3000 GOSUB 60000

We notice that *CLS* in Lines 2000 and 3000 are redundant, being included in the new subroutine, so we *EDIT* them out of the two lines.

When we *RUN* the program, an RG Error in Line 6001 appears because CoCo doesn't know where to go. It does this because after the third problem panel is completed, CoCo notes Lines 4000; 60000; at 60001 it is frustrated. If we don't tell it to go someplace, we need an infinite loop to keep CoCo from reaching the subroutine. Let's keep CoCo happy.

4001 GOTO 4001

Make two copies of work in progress. *CSAVE"ADDB"*.

```
0 'ADDB
4 X=0
5 CLS
6 GOSUB60000
10 PRINTTAB(15)"2"
```

```
20 PRINTTAB(14)"+3"
30 PRINTTAB(14)"--    ";:INPUTA
50 PRINTTAB(14)A
60 IF A=5 THEN X=X+1:GOSUB1000
61 IF A<>5 GOTO5
70 GOTO2000
1000 PRINT@322,"YOU GOT"X"RIGHT
SO FAR!"
1010 PRINT:INPUT"                PRE
SS <ENTER>";OA
1020 CLS
1030 RETURN
2000 GOSUB60000
2010 PRINTTAB(15)"3"
2020 PRINTTAB(14)"+1"
2030 PRINTTAB(14)"--    ";:INPUTA
2040 PRINTTAB(14)A
2050 IF A=4 THEN X=X+1:GOSUB1000
2051 IF A<>4 THEN GOTO2000
3000 GOSUB60000
3010 PRINTTAB(15)"2"
3020 PRINTTAB(14)"+2"
3030 PRINTTAB(14)"--    ";:INPUTA
3040 PRINTTAB(14)A
3050 IF A=4 THEN X=X+1:GOSUB1000
3051 IF A<>4 THEN GOTO2000
4000 PRINT"NEXT PANEL PLEASE."
4001 GOTO4001
60000 CLS:FOR Y=1 TO 5:PRINT:NEX
T
60001 RETURN
```

We would like to get randomly selected problems because that makes for a better program. The problem now is to make the problems change randomly and give the correct answers. We decide the parameters to add numerals one through five, to numerals one through five.

7 Q=RND(5):R=RND(5)

Q is the variable assigned to the first numeral and R is assigned for the second numeral. Since the first numeral is placed on the screen in Line 10, we change it to read:

10 PRINTTAB(15)Q

The second numeral is placed on the screen in Line 20.

20 PRINTTAB(14)"+"R

Since we are using the input variable A as the answer, the right answer must be A=Q+R. Any other answer is wrong. A<>Q+R. We change the number 5 in Lines 60 and 61 to Q+R.

60 IF A=Q+R THEN X=X+1:
GOSUB1000
61 IF A<>Q+R THEN CLS:
GOTO5

If we get an incorrect answer, we must return to Line 5. If we do, the next time around, we should get a new problem.

We note the routines look good. As a safety precaution, we don't want to take a chance and have Q added to Q or R added to R. We make sure by adding reset values of zero to Q and R.

5 CLS:Q=0:R=0

As it is, they are unnecessary because Line 7 will reset to new values. Remember, we can always delete unnecessary information later.

We make two copies of the work in progress. *CSAVE"ADDC"*.

```
0 'ADDC
4 X=0
5 CLS:Q=0:R=0
6 GOSUB60000
7 Q=RND(5):R=RND(5)
10 PRINTTAB(15)Q
20 PRINTTAB(14)"+"R
30 PRINTTAB(14)"--    ";:INPUTA
50 PRINTTAB(14)A
60 IF A=Q+R THEN X=X+1:GOSUB1000
61 IF A<>Q+R THEN CLS:GOTO5
70 GOTO2000
1000 PRINT@322,"YOU GOT"X"RIGHT
SO FAR!"
1010 PRINT:INPUT"                PRE
SS <ENTER>";OA
1020 CLS
1030 RETURN
2000 GOSUB60000
2010 PRINTTAB(15)"3"
2020 PRINTTAB(14)"+1"
2030 PRINTTAB(14)"--    ";:INPUTA
2040 PRINTTAB(14)A
2050 IF A=4 THEN X=X+1:GOSUB1000
2051 IF A<>4 THEN GOTO2000
3000 GOSUB60000
3010 PRINTTAB(15)"2"
3020 PRINTTAB(14)"+2"
3030 PRINTTAB(14)"--    ";:INPUTA
3040 PRINTTAB(14)A
3050 IF A=4 THEN X=X+1:GOSUB1000
3051 IF A<>4 THEN GOTO2000
4000 PRINT"NEXT PANEL PLEASE."
4001 GOTO4001
60000 CLS:FOR Y=1 TO 5:PRINT:NEX
T
60001 RETURN
```

We don't need Q=0 and R=0 after *RUN* and checking out the work. We edit them out.

5 CLS

We get a new problem by looping Line 70 back to Line 5.

70 GOTO 5

Line 50 doesn't align properly, so we move over one space to the right.

50 PRINTTAB(15)A

RAINBOWfest℠

Irvine

Feb. 15-17

Joining in the fun and excitement of **RAINBOWfest** is a great way to get to know the CoCo Community. Many of those who write for THE RAINBOW — and those who are written about — attend CoCo's very own show. It's a people-to-people event as well as a valuable learning experience.

For the 1984-85 season, we've scheduled three **RAINBOWfests** in three parts of the country. If you missed the **RAINBOWfest** in Princeton, N.J., why don't you make plans now to be with us in Irvine, Calif., or Chicago, Ill.? Each show will offer fun, excitement, new products, seminars and information for your CoCo! And for those who (perish the thought) don't like CoCo as much as you, we've scheduled each **RAINBOWfest** in an area that will provide fun and enjoyment for the whole family.

Our Irvine, California, show is being held at the Irvine Marriott Hotel, which offers special rates for **RAINBOWfest**. The show opens Friday evening with a 7 p.m. to 10 p.m. session. It's a daytime-only show Saturday — the CoCo Community Breakfast is at 8 a.m., then the exhibit hall opens promptly at 10 a.m. and runs continuously until 6 p.m. There will be no exhibition hours or seminars Saturday evening. On Sunday, the exhibit hall opens at 11 a.m. and closes at 4 p.m.

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Note the answer to 5+5 won't align properly, without extra work. But, statistically, it is an infrequently called problem and thus is no big deal. We won't bother programming a special alignment for it.

Obviously, now that we can get all the problems we desire, a lot of this program becomes unnecessary. We can delete Line 2000 to the end of the program. But, first, transfer Line 60000 to Line 6.

6 CLS:FOR I=1 TO 6:PRINT:NEXT

Note that we inadvertently changed the variable Y to I and 5 to 6. No harm done! We now *DEL 2000–*. We don't need Lines 4 and 5, *DEL 4-5*.

RUN. Deleting Line 5 doesn't give Line 61 anyplace to go. CoCo is mad! Change Line 61 to *GOTO* Line 6.

61 IF A<>Q+R THEN CLS:GOTO   6

Time to make two copies of work in progress. *CSAVE"ADDD"*.

```
0 '<ADDD>
6 CLS:FOR I=1 TO 6:PRINT:NEXT
7 Q=RND(5):R=RND(5)
10 PRINTTAB(15)Q
20 PRINTTAB(14)"+"R
30 PRINTTAB(14)"--      ";:INPUTA
50 PRINTTAB(15)A
60 IF A=Q+R THEN X=X+1:GOSUB1000
61 IF A<>Q+R THEN CLS:GOTO6
70 GOTO 6
1000 PRINT@322,"YOU GOT"X"RIGHT
SO FAR!"
1010 PRINT:INPUT"              PRES
S <ENTER>";OA
1020 CLS
1030 RETURN
```

Note that no negative reinforcement is desired by indicating the total number of attempts or the number of incorrectly answered problems.

For variety and practice working with other combinations of numbers, Q and R may be changed in Line 7 to any values that add up to 10.

i.e. Q=1 R=9 <7 Q=1:R=RND(9)>
i.e. Q=3 R=7 <7 Q=RND(3):R=
RND(7)

If Q=0 or Q=1, don't use *RND*. It is a waste of time. We change our program, with the new variables in the second example.

7 Q=RND(3):R=RND(7)

We note that Line 30 needs to be moved one space to the right.

30 PRINTTAB(15)"--   ";:INPUT A

We try to format the program to make it neat and well-centered. We move the problem up one row.

6 CLS: FOR I = 1 TO 5:PRINT:NEXT

We drop the scoring line, 1000 down a row by adding +32 to 322 and then we center the line of text by moving it over +3 spaces. 322+32+3===357.

1000 PRINT@357,"YOU GOT"X"   RIGHT SO FAR!"

Move Line 1001 over to the left by editing out one space after the first quotes.

It would be nice to add a bit of sound whenever the child gets a correct answer. We might as well telegraph when an incorrect answer is given. I am not sure this last is wise but for the purpose of this program, we'll include a mistake sound.

In Line 61, insert *PLAY"O1FC":* after *THEN*. Do it now. In Line 60, insert *PLAY"O3L16CEGL8O4CL16O3GL4O4C":* at the very beginning.

Make two copies of you know what, *CSAVE"ADDE"*.

In order not to add negative reinforcement, we will not show an incorrect answer in Line 50. Any of the three lines below will be OK.

40 IF A<>Q+R THEN 61
40 IF A<>Q+R GOTO 61
40 IF A<>Q+R THEN GOTO 61

You better make three copies this time, *CSAVE"ADDF"*.

```
0 '<ADDF>
6 CLS:FOR I=1 TO 5:PRINT:NEXT
7 Q=RND(3):R=RND(7)
10 PRINTTAB(15)Q
20 PRINTTAB(14)"+"R
30 PRINTTAB(15)"--      ";:INPUTA
40 IF A<>Q+R GOTO 61
50 PRINTTAB(15)A
60 IF A=Q+R THEN X=X+1:GOSUB1000
61 IF A<>Q+R THEN PLAY"O1FC":CLS
:GOTO6
70 GOTO 6
1000 PLAY"O3L16CEGL8O4CL16O3GL4O
4C":PRINT@357,"YOU GOT"X"RIGHT S
O FAR!"
1010 PRINT:INPUT"             PRESS
 <ENTER>";OA
1020 CLS
1030 RETURN
```

For practice, convert Lines 10; 20; 30; using *PRINT@* instead of *PRINTTAB*.

Design a neat title page. Make up an instruction panel, as simple as possible, so beginner readers can understand it. Don't forget to insert a header with your name and address. It is now your program.

The proof of the pudding is to try it out on your youngsters or neighborhood kids to see if it is effective. No program has any value, unless those for whom it is intended can run it and use it to advantage.

You are urged to pick some simple idea and create a program around it. If you can create a creditable program, after studying 11 chapters in the manual, can you imagine what fine programs you will be able to create when you master the entire manual?

Yet, the most important point to be made is to make lots of copies of your work. Erase your working programs with care. There seems to be some rule. After you erase the program, guess what you are looking for. I hope you had fun and perhaps inspiration to work up an idea this article may have suggested.

16K
Disk

Everything You Always Wanted To Know About The Color Computer

But Radio Shack Didn't Tell You

This is part four in a series of articles concerning various aspects of the Color Computer.

By Andy Kluck

This month we will examine some of the peculiarities of Disk BASIC. The use of the *&H* prefix for Hex constants and *&O* or just *&* for Octal constants is described in the Extended BASIC manual, but it doesn't tell you what you have to do to convert Hex or Octal values contained in strings to numeric variables. This can be done by adding the prefix to the string and taking the value of the result:

```
H=VAL("&H"+H$)
O=VAL("&"+O$)
```

Concurrent Files

The Disk BASIC *OPEN* statement gives an AO Error if the specified device number is already open. In most cases it also gives this error if the same file is already open on another device number. However, an exception is made if the new *OPEN* statement uses the same access mode, either input or random (direct), as the file was previously opened with. This apparently intentional loophole allows a file to be opened and accessed through two or more device numbers at the same time as long as all *OPEN* statements use the same mode, input or random. This could be useful if you need to access two parts of a file at the same time.

COPY

For some strange reason, *COPY* is listed in a section of the Disk manual entitled "Special Multi-Drive Commands." This seems unfortunate, since such a command is the only efficient way to duplicate binary and data files. However, the *COPY* routine actually has a special provision for copying with one drive. If *COPY* is used with only one filename: *COPY "FILENAME/EXT"* instead of the syntax suggested in the Disk manual, the computer will request the user to switch disks as many times as necessary to copy the file. According to the "Disk BASIC Summary" in the back of the manual, executing *COPY* will "erase memory." This is misleading. Unlike *BACKUP* and *DSKINI, COPY* uses only the area of free memory between the array variables and the stack for its data storage. *COPY* does not clear variables, and it may be used within a program. There is one problem with *COPY*, either with one or two drives; because of a bug in *CLOSE*, with either Disk BASIC 1.0 or 1.1, an I/O Error in *COPY* can cause a system crash.

(Andy Kluck is an electrical engineering student at the University of Texas at Austin.)

DIR

Disk BASIC does not support listing of a diskette's directory to the printer; however, this can be done by setting the device number at $6F to –2 and then calling the directory routine:

```
POKE 111,254:DIR
```

The two instructions should not be separated, and if executed within a program should be followed by:

```
POKE 111,0
```

to redirect output to device 0.

RUN

The statement *100 RUN A$(X)* might be useful in a menu program. However, it doesn't work because Disk BASIC assumes that if the first character of whatever follows *RUN* isn't a quote, then it is a line number. The problem may be solved by adding an empty string: *100 RUN ""*+A$(X)

VERIFY

According to the Disk BASIC manual, *VERIFY ON* causes a VF Error if a sector is written incorrectly. Actually, the routine that handles the verifying does more than this. When it detects that a sector has been written in error, it does not simply give a VF Error and give up; instead it attempts to write the sector up to four more times before it gives the error. So disk BASIC with *VERIFY ON* does not just tell you when it has glitched your directory; it often can repair it immediately without you or your application program knowing what happened. Incidentally, if you get I/O Errors reading disks made without *VERIFY ON*, try: *? PEEK(&HF0)* after the errors. If you get an eight or 16, there's a good chance that *VERIFY ON* would have prevented the error. Unless your drive has a better than average reliability record, I recommend *VERIFY ON* at all times except for *BACKUP*s, which take a long, long time with verify. Instead, a fast disk scanner may be used to test the destination disk after *BACKUP*. For example, this BASIC program can usually test a disk in about 15 seconds if there are no errors.

The listing:

```
10 FOR A=&H1DA TO &H1F8: READ I$
: V=VAL("&H"+I$):S=S+V: POKE A,V
: NEXT
20 IF S<>4040 THEN PRINT"DATA ER
ROR": STOP
30 S=1
40 FOR N=1 TO S
50 FOR A=&H1FA TO &H20B
60 READ I
70 POKE A,I
80 NEXT A
90 NEXT N
100 POKE &HEA,2 ' READ SECTORS
110 POKE &HEB,0 ' DRIVE 0
120 POKE &HEE,4: POKE &HEF,0
130 FOR TR=0 TO 34
140 POKE &HEC,TR
150 EXEC &H1DA ' READ TRACK
160 IF PEEK(&H1F9)=0 THEN 240
170 FOR A=&H1FA TO &H20B
180 SE=PEEK(A)
190 E=PEEK(A+18)
200 IF E=0 THEN 230
210 ER=ER+1
220 PRINT "ERROR";E;"ON TRACK";T
R;"SECTOR";SE
230 NEXT A
240 NEXT TR
250 PRINT ER;"TOTAL ERRORS."
260 DATA 7F,01,F9,8E,01,FA,A6,80
270 DATA 97,ED,AD,9F,C0,04,96,F0
280 DATA A7,88,11,BA,01,F9,B7,01
290 DATA F9,8C,02,0C,26,E8,39
300 DATA 1,12,5,16,9,2,13,6,17
310 DATA 10,3,14,7,18,11,4,15,8
320 DATA 1,5,9,13,17,3,7,11,15
330 DATA 12,16,2,6,10,14,18,4,8
```

The program assumes that the disk was formatted with a skip factor of four and attempts to read each track in one revolution of the disk. In some cases, however, depending on the current drive speed, the speed at which the disk was formatted, and the speed at which the sectors were written, the end of one sector comes too close to the beginning of the next sector. This results in much slower operation. If the program runs slower than about 2.5 tracks per second on some disks, replace Line 30 with:

```
30 S=2
```

With this setting the program will read every other sector and take two revolutions to read each track by using the sector order of Lines 320 and 330 instead of Lines 300 and 310. Finally, in order to implement *VERIFY ON* in some software packages it may be necessary to insert the *VERIFY* statement into the program; for example, with the *Telewriter*, add the line:

```
0 VERIFY ON
```

to the program: *S/XXX*.

CLOSE

There are several problems in the part of the *CLOSE* routine in the Disk BASIC 1.0 ROM used with random (direct) access. A misdirected branch at *$CACC* causes some strings fielded in buffers other than the one being closed to be deleted. Also, because of a stack mess up, any string array elements fielded in any buffer can cause unexpected results. Most importantly, whenever a random file other than the last one opened is closed, the system crashes. Therefore, if you must have two or more random files open at once, open them in ascending order and close them in descending order by device number. Remember that whenever an error occurs, files are closed in descending order. A similar problem may occur in *COPY* — if an I/O Error occurs while one of the files is open, *CLOSE* gets confused and causes the same crash. While the first three problems are fixed in the 1.1 Disk ROM, the last one is not.

The Case Of The Garbled Up Disk

Radio Shack devotes a whole chapter to the garbled up disks, but they omit some of the common causes of disk garbling. Starting at address *$800* there are four areas used to store the file allocation table of each drive with open files. Each area also has one byte used to count the number of open files on that

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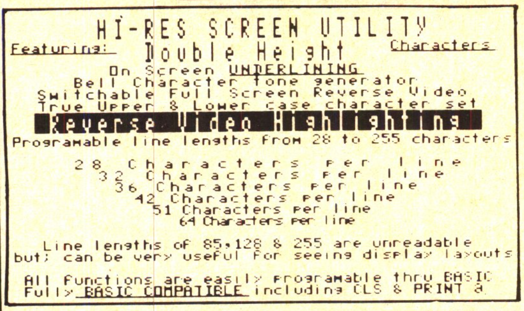

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Standard Commands

Textpro III features a whole host of Document Formatting commands. The setup command section includes: Line Length, Top, Left, and Bottom Margins, Page Length, Page Numbering on/off and Automatic Word Fill and Justification on/off.

Some of the vertical control features include: test for number of lines left on the page, skip to next page, set page number, wait at top of page, single and multi line spacing, and skip blank lines.

Textpro III features 3 programmable header lines that can be centered, left or right justified. It also has one programmable footer line. 3 commands for continues, single and paragraph indenting, center text, underline and double width print commands.

Footnotes and Special Commands

Some of the special features allow imbedded control codes to access intelligent printer features like; superscript, subscript, change type font and even graphics. You can even imbed control codes within justified text. There is a command that automatically places footnotes at the bottom of the page, which can be very handy for term papers, etc. Another command allows you to display a message on the screen and input text from the keyboard. This text is then printed as if it has been part of the original text, thus you can produce things like a personalized form letter. There is also a repeat command that allows you to repeat an entire document or a part of one as many times as needed up to 255 times. This can be used to produce mailing labels or combined with the previous command to produce a selected number of personalized form letters.

Tab Functions

Textpro III features an elaborate system of tab commands for complete control over column formatting. There are 10 programmable tab stops that can be defined or re-defined at any time in the text file. They can be used with the following tab commands; Center Over Tab Column, Right Justify to Tab Column, Decimal Align Over Tab Column, Left Justify to Tab Column (Normal Tab) and Horizontal Tab. Tab functions may also be used with a numeric tab column position for maximum flexibility. You can also define the Tab Fill Character to any printable character to fill in the blanks with dots, dashes, etc.

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drive, and one byte that counts changes in the *FAT* and indicates whether the table should be written out when a file on that disk is closed. Any loading of garbage into this area is likely to mess up these bytes such that the next time a file on the disk is closed, the garbage is written out to the disk's *FAT* sector, which is essential to accessing the files. For example, many programs designed for cassette systems load starting at *$600*. If one of these were converted to a disk file with a tape to disk program, a likely result of attempting to load it would be not just a crashed BASIC but also an unusable disk. A similar problem could occur if the program was loaded from a cassette and an attempt was made to save it on a disk. This is also what can happen if you use a certain often-published *PCLEAR 0* routine and try to *LOAD* a BASIC program. While these situations all arise out of user error in messing with BASIC's reserved areas, a similar problem can be caused by another of the bugs in Disk BASIC 1.0. Whenever the *File Allocation Table* is written out on the disk (during *CLOSE, KILL, WRITE*, etc.) the "number of open files" counter for the next higher numbered drive is set to zero by a botched instruction at *$C70C*. Because of this, any changes in the *FAT* made on a disk in one drive (due to *CLOSE, KILL*, etc.) while files are open on the next higher drive, can result in the file counter of the higher drive being decremented to a non-zero number when the files on it are closed. If this happens, any disk later placed in the higher numbered drive may be wrecked by having its *File Allocation Table* overwritten by a copy of the *FAT* from another disk. For example, if you open a file on drive 1, *SAVE* or *KILL* on drive 0, *CLOSE* all files or *UNLOAD 1*, switch disks in drive 1, and *SAVE* on drive 1, the new disk may get the *FAT* copied from the old one and require reconstruction efforts to recover files. This does not apply in a one-drive system, but if you're going to *OPEN* any files on any drive except 0, and work with other drives while they're open, I recommend using Disk BASIC 1.1, in RAM if necessary, to avoid this problem.

UNLOAD And END

The Disk BASIC manual cautions that you should use *UNLOAD* before switching disks whenever there may be files open. But all *UNLOAD* does is close all files on the specified or default drive. So unless you want to leave files on some drives open, you can save keystrokes by using *END*, which closes all disk and cassette files, or any syntax error, as the Disk BASIC error routine closes all disk files. Note also that *UNLOAD* closes files from low to high device numbers, the opposite order from *CLOSE*, so *UNLOAD* can trigger the random files crash in the 1.0 Disk ROM.

64K

As you probably know, the Radio Shack 32K CoCo contains 64K RAM chips, and with a hardware modification first published by Frank Hogg in February of '82 and eventually adopted by Radio Shack for use in the current revision circuit boards, the full 64K can be accessed through memory paging. One way to use this extra memory is to run a program like:

```
10 FOR I=0 TO 22
20 READ X: POKE 950+I,X
30 NEXT I
40 EXEC 950
50 DATA 26,80,142,128,0,183
60 DATA 255,222,236,132,183,255
70 DATA 223,237,129,140,255,0
80 DATA 38,241,28,175,57
```

to copy the BASIC interpreters into the upper half of RAM and leave the SAM in map type one so that BASIC may be modified and the area above BASIC may be used as extra RAM. Many people have assumed that without the modification, which prevents a bus conflict problem during write operations, or the new board, none of the extra memory may be accessed. It appears, however, that even without the modification there should be no problem writing at addresses that would be unoccupied by ROM in map type zero, or even at addresses that would contain ROM as long as the data to be written is copied directly from the ROM, avoiding the bus conflict. This means that even in the older, unmodified 32K units, about 16K of free memory in the range of *$C000–$FEFF* may be easily accessed if a disk controller or ROM cartridge is not in the system by simply running the above program. After running this program, the system is actually in the 64K mode, although without the modification the 16K from *$8000–$BFFF* is unable to reliably store anything other than an exact copy of the ROM, so it's really more of a 48K computer. I have seen several articles regarding the process of relocating ROM packs to run in low RAM, but this seems hardly worth the effort when you can load the programs in RAM from tape and run them at the address they were designed for without breaking your warranty seal to effect a true 64K computer. There is also another use for this mode; if even Extended BASIC is not in the system, it can be loaded from tape and *EXECed*. To make the tape:

```
CSAVEM "XBASIC", &H8000,
&H9FFF, &H8002
```

Remember that pressing Reset sets the SAM back to map type zero, the ROM mode, and makes the RAM above 32K disappear; also, the high speed (address dependent) mode will not work in map type one.

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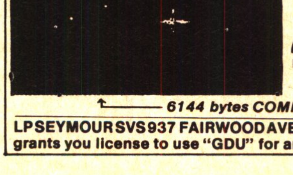
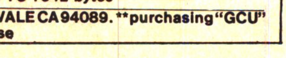


RAINBOW CERTIFICATION SEAL



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JINFILE A Jumbo With Some Very

JINFILE is a special purpose filing program designed to create, save and retrieve very long file entries. Unlike many database managers, every search can be completely different from the last, and you don't have to plan the searches when you create your data file. Besides this, it is simple and safe to operate: in a year of frequent use by a non-programmer there has not been a significant system or user-caused data loss. It requires a 32K Extended BASIC Color Computer, one disk drive and a printer.

The file structure is based on random access records which hold up to 1.5K of information on each entry. Records are stored in one of four compatible categories, and depending on the category, may contain up to 17 elements of varying lengths. Table 1 describes the categories, their associated elements and the length of each element. Once created, the records are retrieved by either calling a specific entry by number or describing the type of information desired, and letting the program search for all of the records fitting your description.

The four categories available reflect the original purpose of *JINFILE* — to support research in art history. However, it is easy to change these to suit your own needs. The arrays are described in Tables 1 and 2. Lines 400 and 1600 define the four acceptable category codes, and the lead items in

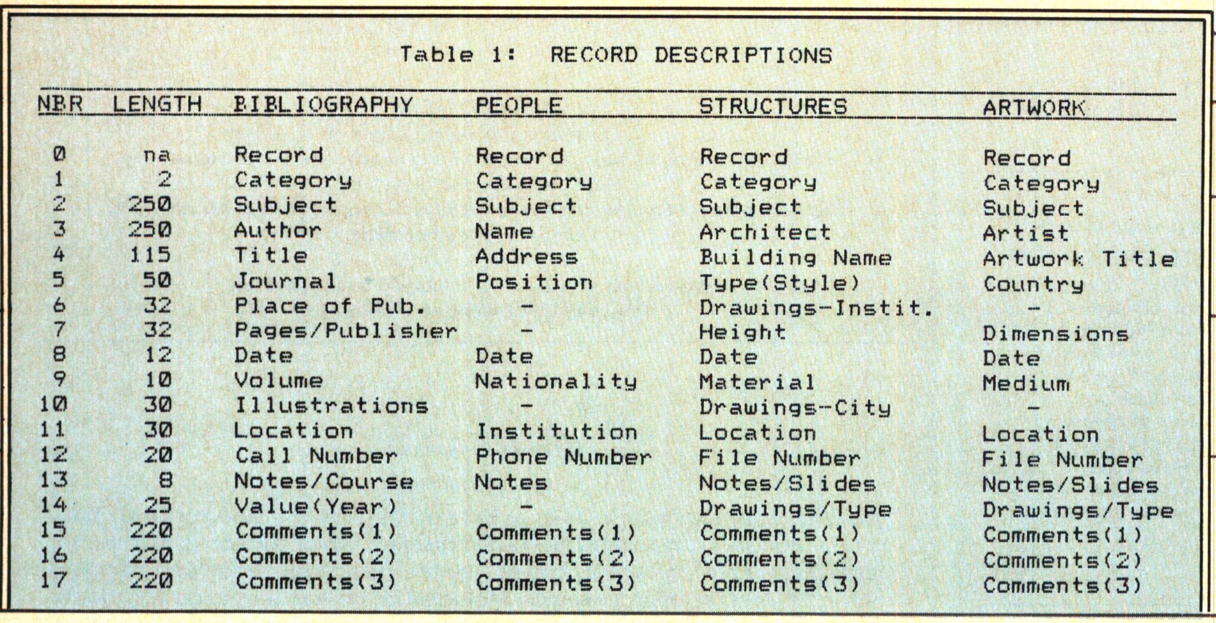


Table 1: RECORD DESCRIPTIONS

NBR	LENGTH	BIBLIOGRAPHY	PEOPLE	STRUCTURES	ARTWORK
0	na	Record	Record	Record	Record
1	2	Category	Category	Category	Category
2	250	Subject	Subject	Subject	Subject
3	250	Author	Name	Architect	Artist
4	115	Title	Address	Building Name	Artwork Title
5	50	Journal	Position	Type(Style)	Country
6	32	Place of Pub.	-	Drawings-Instit.	-
7	32	Pages/Publisher	-	Height	Dimensions
8	12	Date	Date	Date	Date
9	10	Volume	Nationality	Material	Medium
10	30	Illustrations	-	Drawings-City	-
11	30	Location	Institution	Location	Location
12	20	Call Number	Phone Number	File Number	File Number
13	8	Notes/Course	Notes	Notes/Slides	Notes/Slides
14	25	Value(Year)	-	Drawings/Type	Drawings/Type
15	220	Comments(1)	Comments(1)	Comments(1)	Comments(1)
16	220	Comments(2)	Comments(2)	Comments(2)	Comments(2)
17	220	Comments(3)	Comments(3)	Comments(3)	Comments(3)

(Bob Weir is a graduate student in computer science at the University of North Carolina, Chapel Hill.)

Information File Handler Special Features

By Robert Weir

data Lines 2010, 2020, 2030 and 2040 provide their names. Element names can be altered by changing data Lines 2005 to 2060. Be sure the sum of the *LN* values does not exceed the value specified in the *FILES* statement in Line 50. If you modify *JINFILE*, it is a good idea to plan your alterations using tables similar to Tables 1 and 2.

After you have *JINFILE* saved on disk, you can run it just like any other BASIC program — type *RUN "JINFILE"* and it will load and execute. Once the program is loaded into memory, the program disk is not required, and you can leave your data disk in for the entire work session. As a safety feature, *JINFILE* closes disk files immediately after reading or writing a record. This means that you can end the program at any time the disk light is not lit simply by pressing BREAK. It may not be the most elegant way to end, but you don't have to worry about losing data unintentionally.

When the program is run, you first see the main menu (Table 3). You can select the desired command by simply pressing the indicated key.

Data Input

Input is selected from the main menu by pressing 'D'. You will be asked for the disk number. This is for your reference primarily, and can be anything you choose as long as it is a

```
                    Table 2:  MATRIX LISTINGS

Matrix NM$(3,17) which provides element names and matrix LN(17) which
provides element lengths are contained in Table 1.

  PX  (3,17) :  Provides ordered values for data input
                or printing.

Symbol      B     P     S     A
       X    0     1     2     3
   Y
   0:       0     0     0     0
   1:       1     1     1     1
   2:       2     2     2     2
   3:       3     3     3     3
   4:       4     4     4     4
   5:       5    11     5     9
   6:       6    12     8     8
   7:       7     5     9    11
   8:       8     9     7     5
   9:       9     8    11     7
  10:      10    13     6    12
  11:      11    15    14    13
  12:      12    16    10    14
  13:      13    17    12    15
  14:      14    -1    13    16
  15:      15    -1    15    17
  16:      16    -1    16    -1
  17:      17    -1    17    -1

  PP  (6) :  Provides reference start positions for the
             PS array pages.  Last value is dummy.

 PAGE:        0     1     2     3     4     5     6

              0    10    17    20    24    26    27
```

number. Next you will enter your two-letter category/subcategory code. The category is indicated by one of the letters 'B','P','S', or 'A' corresponding to the first letter of each category name. Subcategory is a different matter. It is mainly designed for future implementation of a disk record directory, and can now be any printable character you desire. The recommended use of subcategory is to cover very broad areas that span the range of categories. Examples are Crafts, Course references, Canadian Arts and Architecture.

After that, each element will be requested with a special screen display to assist in keeping the element length within the allowable limits. If you do enter one that's too long, then one of two things will happen. If it is a long entry, then the overlength end will be chopped off, and you'll be informed. If it is a short entry, then the entire element is erased and you must redo it.

When entering data, provide the information requested in any format that you are comfortable with. For example, under Subject, list in any order all of the subjects you might want to find the record by. It is not necessary to separate each item, but commas help readability. If you use abbreviations, be *very* careful because consistency is the key to having successful searches. Experienced *JINFILE* users keep a summary sheet of most often used abbreviations handy.

Ideally, subjects should be chosen in a manner resembling the waterfall technique used in building outlines. This will allow successful searches at various different levels of detail. It is highly recommended that you never use lowercase letters. The program is not sophisticated enough to tell that "CRAFTS" is the same as "Crafts." Consequently, you can see that searches might fail for no other reason than an injudicious use of lowercase letters.

You do not have to enter anything for elements that do not apply. Simply press ENTER and the phrase "NO ENTRY" will be inserted in that element for you.

When all elements have been entered, a new menu will appear, offering you the following choices:

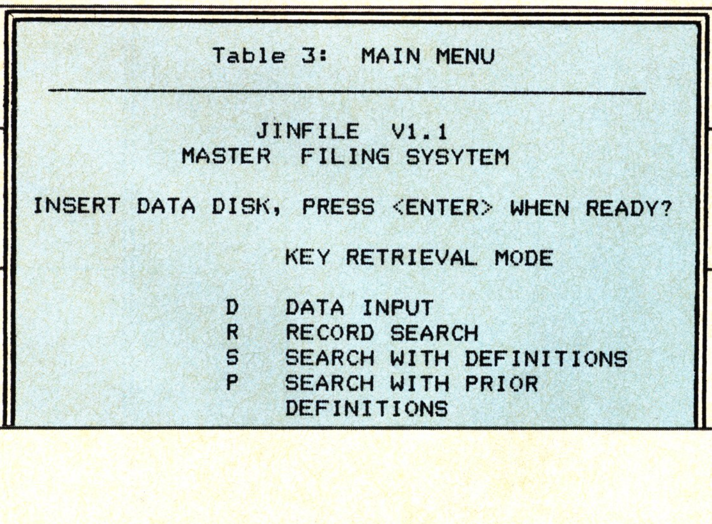
S Save file on disk
R Review entry
X Finished data entry
N Input new entry

Selecting Review will allow you to edit the record before it is saved to disk. After editing, the above menu will return. You should then select Save before adding the next record. 'N' will return you to the start of Data Input and 'X' will return you to the main menu.

Searching For Records

There are two very different ways to retrieve a record that has been saved on disk. The quickest way can be used when you know exactly which record you want. The other method, searching with definitions, takes considerably longer, but this is the way to gather all of the information that has been saved on a particular range of subjects.

To conduct a record search, insert the data disk that contains the desired record when the main menu appears. Then select 'R' at the main menu. The screen will clear, and you will be asked to provide the desired record number. This number can be the complete record number, or just the last three digits of the number. The program does not care if you



```
        Table 3:  MAIN MENU
 ____________________________________

           JINFILE  V1.1
       MASTER  FILING SYSYTEM

INSERT DATA DISK, PRESS <ENTER> WHEN READY?

           KEY RETRIEVAL MODE

        D    DATA INPUT
        R    RECORD SEARCH
        S    SEARCH WITH DEFINITIONS
        P    SEARCH WITH PRIOR
             DEFINITIONS
```

call for record 4003, 3, or even 6003. It is only interested in which record to look for on the disk currently in the drive, and that information is provided by the 3.

When you have provided the record number (followed by ENTER), it will commence a search on the disk. If the record cannot be found, then an error message will be displayed. This will say:

IMPROPER ENTRY, (nbr) REDO

The number provided will be the number you entered. This error will generally occur only when you ask for a number larger than the largest entry presently on the disk. It will also occur if you specify a number less than one.

When the record has been found, display page 0 will appear, and all of the display, print and editing functions are then available. Press 'X' when you are finished with the record, and you will be asked if you want another record. Answer "NO" to return to main menu.

When you want to conduct a descriptive search, then think in threes. You can search any three lines of your 17-line record for the occurrence of up to three sets of three key phrases. Naturally, these are upper limits, and you can choose to search only one line for one specific word.

Select 'S' at the main menu for a descriptive search. You will be asked for the category and subcategory to be searched. The whole entry is a two-letter specification followed by ENTER. If, for example, you are only interested in printed materials, then the category will be 'B'. If you wish for more than one category to be searched, then enter 'X'. Subcategory works the same way, and this will generally be 'X'.

You will then be asked to specify each exclusive group. These groups are up to three phrases long. You can specify "Italian Architecture," Dutch Painting," and "Oil" as one exclusive group.

If you have less than three phrases for a group, then just press the ENTER key when an input is called for. The same technique is used if there are less than three exclusive groups — just press ENTER when the first element of the group is called. When your parameters have all been entered, the printer will provide a hard copy of your entry.

The last specifications are the line numbers to search. They are input in the same way as above. Key in each number, followed by ENTER. Typically, searches are conducted in the three lines containing the most information —namely 2 (Subject), 3 (Author), and 4 (Title). The comment lines are also useful to look at, depending on how you have saved your information.

The search will then begin at the first record on the disk. As each successful match is found, it will be displayed on the screen, and all of the normal options to print, display or edit are available. To continue the search, press 'X'. Once the last record on the disk has been reviewed by the program, the main menu will reappear. If you have other disks to search, you should then insert the next disk, and press the 'P' key at the main menu. This will continue the search without the necessity to re-enter the search parameters. Press 'Z' to abort the search and return to main menu.

When choosing parameters to search with, you must carefully evaluate just what you want to see. First, decide how many exclusive groups you wish to use (up to three). Often you will only use one, since these groups are *ANDed* in the

Table 4: SEARCH WORKSHEET

Date: _____

Category/Subcategory: ____/_____ (2 characters; XX for all)

Exclusive Group 1:

(a) ______________________________

OR (b) ______________________________

OR (c) ______________________________

AND Exclusive Group 2:

(a) ______________________________

OR (b) ______________________________

OR (c) ______________________________

AND Exclusive Group 3:

(a) ______________________________

OR (b) ______________________________

OR (c) ______________________________

Lines to Search: ____/____/____

program, which means that in order to retrieve a record, a match *must* be found in each of the groups. For example, if you want to find every record that contains *both* Architecture and Crafts, you would use two exclusive groups. A record that contained only Architecture would not be retrieved.

There will be many times when you wish to see records that contain references to more than one item. For instance, you might want to see all of the references to Dutch Painting as well as anything that discusses Rubens. These parameters would go into a single exclusive group.

If you take these different parameters all together and put them into a matrix, the result will appear as follows:

parameter 1 OR parameter 2 OR parameter 3
AND
Parameter 4 OR parameter 5 OR parameter 6
AND
Parameter 7 OR parameter 8 OR parameter 9

You can fill this matrix up however you wish, just remember that each exclusive group you use will need to be satisfied before a record is retrieved and displayed. Table 4 provides a worksheet to assist in defining your search.

Display Options

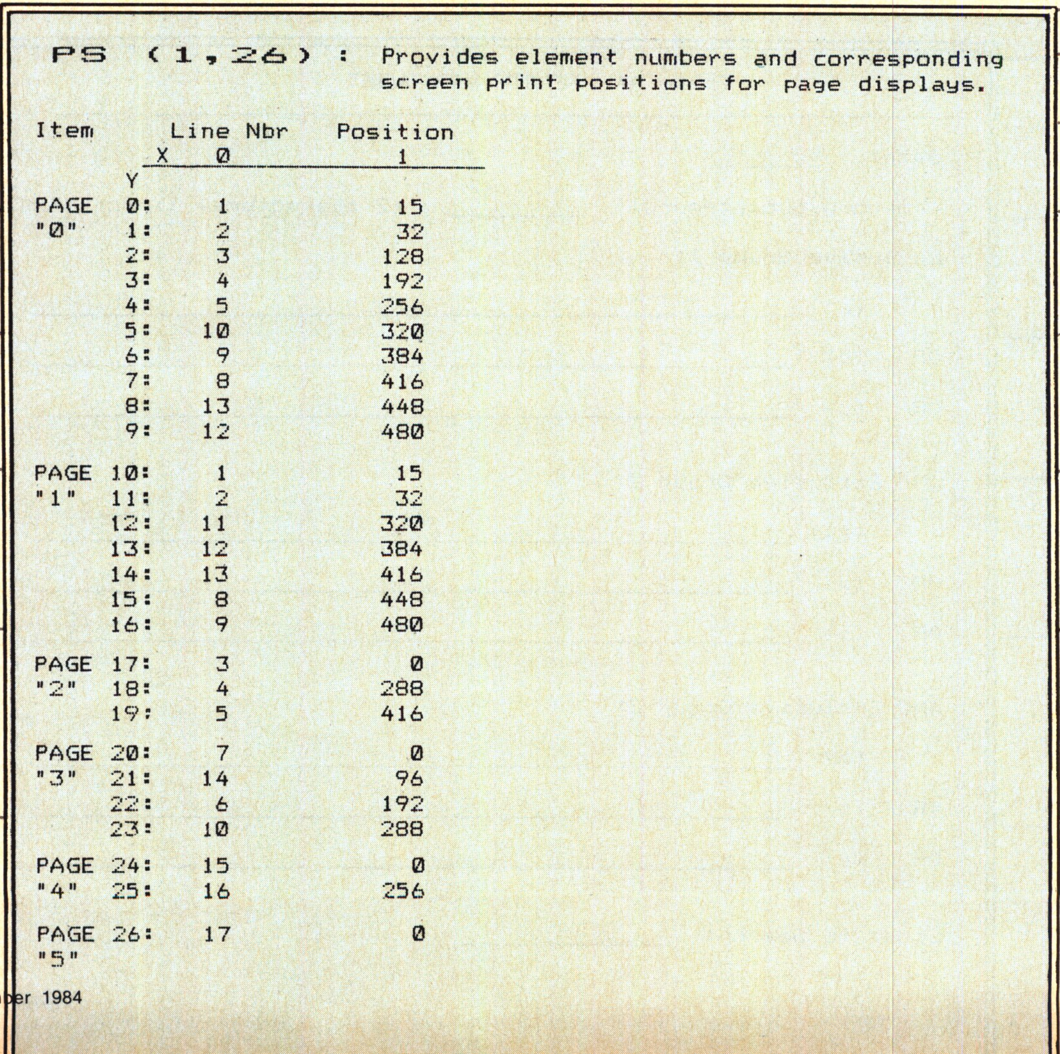
There are a total of six different display pages: 0 to 5. They can be selected at any time and in any order so long as one of the six is presently visible on the screen. Their purpose is to allow you to quickly and efficiently review any part of a record.

There are two points in the program where you have a chance to look at the data file which is currently in memory. The first point is after you have completed entering or correcting a record and are ready to save it on the disk. The other point is when a search has retrieved a record from the disk. You will be able to recognize these times by the display shown. That display is a summary of the most important elements of the record, and is called page 0. It contains the following elements either in whole or in part:

Page 0: (The entries are in Bibliography : People : Structures : Artwork order)
(0) RECORD
(1) CATEGORY
(2) SUBJECT (part)
(3) AUTHOR : NAME : ARCHITECT : ARTIST (part)
(4) TITLE : ADDRESS : BUILDING NAME : ARTWORK TITLE (part)
(5) JOURNAL : POSITION : TYPE(STYLE) : COUNTRY
(10) ILLUSTRATIONS : — : DRAWINGS-CITY : —
(9) VOLUME : NATIONALITY : MATERIAL : MEDIUM
(13) NOTES/COURSE : NOTES : NOTES/SLIDES : NOTES/SLIDES
(12) CALL NBR : PHONE NUMBER : FILE NUMBER : FILE NUMBER

The purpose of page 0 is to put as much information as possible on the screen at one time, and to allow you to make a quick decision as to the next step.

Pages 1 to 5 provide the complete record, and are useful



```
PS  (1,26) :  Provides element numbers and corresponding
              screen print positions for page displays.

Item      Line Nbr    Position
        X   0            1
       Y
PAGE   0:   1           15
"0"    1:   2           32
       2:   3          128
       3:   4          192
       4:   5          256
       5:  10          320
       6:   9          384
       7:   8          416
       8:  13          448
       9:  12          480

PAGE  10:   1           15
"1"   11:   2           32
      12:  11          320
      13:  12          384
      14:  13          416
      15:   8          448
      16:   9          480

PAGE  17:   3            0
"2"   18:   4          288
      19:   5          416

PAGE  20:   7            0
"3"   21:  14           96
      22:   6          192
      23:  10          288

PAGE  24:  15            0
"4"   25:  16          256

PAGE  26:  17            0
"5"
```

for proofreading a data entry or assisting you in your decision to print a record found during searches. They contain:

Page 1:
(0) RECORD
(1) CATEGORY
(2) SUBJECT
(11) LOCATION : INSTITUTION : LOCATION : LOCATION
(12) CALL NUMBER : PHONE NUMBER : FILE NUMBER : FILE NUMBER
(13) NOTES/COURSE : NOTES : NOTES/SLIDES : NOTES/SLIDES
(8) DATE
(9) VOLUME : NATIONALITY : MATERIAL : MEDIUM

Page 2:
(3) AUTHOR : NAME : ARCHITECT : ARTIST
(4) TITLE : ADDRESS : BUILDING NAME : ARTWORK TITLE
(5) JOURNAL : POSITION : TYPE(STYLE) : COUNTRY

Page 3:
(7) PAGES/PUBLISHER : — : HEIGHT : DIMENSIONS
(14) VALUE(YEAR) : — : DRAWINGS(TYPE) : DRAWINGS(TYPE)
(6) PLACE OF PUB. : — : DRAWINGS-INSTIT. : —
(10) ILLUSTRATIONS : — : DRAWINGS-CITY : —

Page 4:
(15) COMMENTS(1)
(16) COMMENTS(2)

Page 5:
(17) COMMENTS(3)

To use these displays, all you have to do is press the number key for the page desired, and it will instantly appear. Remember that you can only do this when one of the pages is visible on the screen. You should also note that after printing a record you are returned to this display mode, since there are many other commands available besides page displays. Table 5, Page Display Commands, provides a summary of them.

Print Options

Print options, of which there are three, can be selected when you are in the display mode. Display mode is achieved automatically when you select "Review" after entering or editing a record or when the program has found a record during a search.

The three options are for either:
a) the complete record
b) a summary of the record
c) a tailored printout of the elements you desire in the order that you want to see them

Print options are selected in the same way as display options. When any page (0-6) is visible, press the appropriate key from Table 5. You will then be asked to prepare the printer and paper.

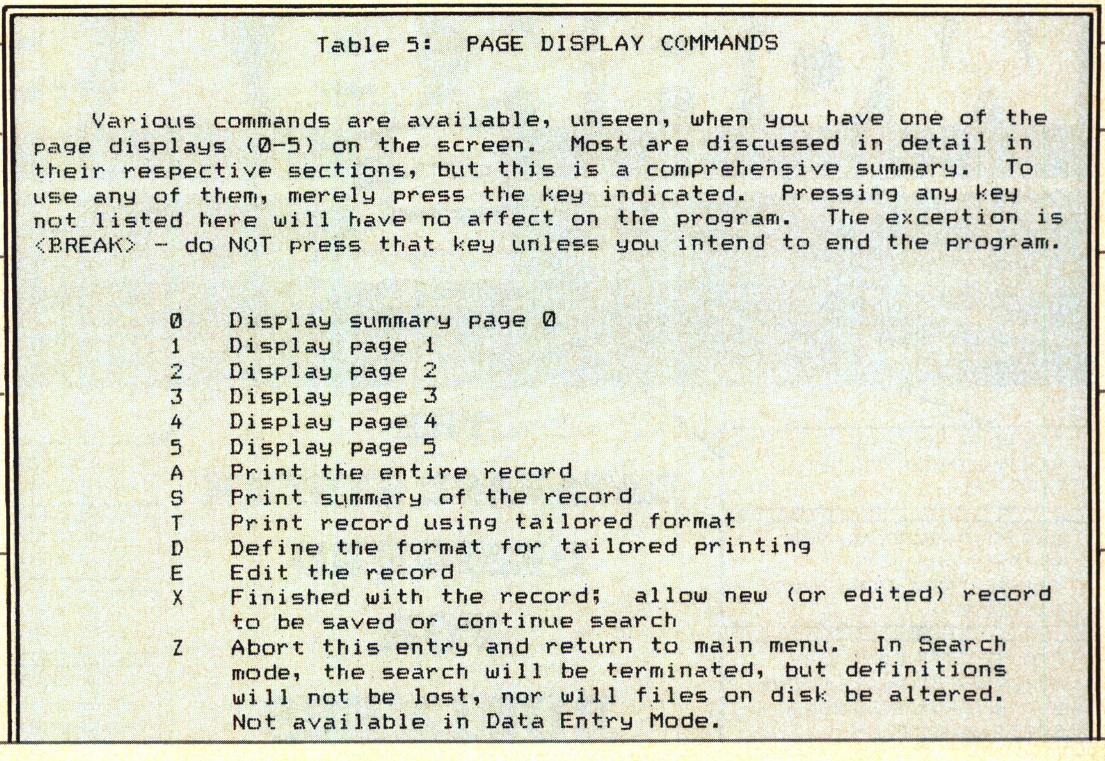


Table 5: PAGE DISPLAY COMMANDS

Various commands are available, unseen, when you have one of the page displays (0-5) on the screen. Most are discussed in detail in their respective sections, but this is a comprehensive summary. To use any of them, merely press the key indicated. Pressing any key not listed here will have no affect on the program. The exception is <BREAK> - do NOT press that key unless you intend to end the program.

0	Display summary page 0
1	Display page 1
2	Display page 2
3	Display page 3
4	Display page 4
5	Display page 5
A	Print the entire record
S	Print summary of the record
T	Print record using tailored format
D	Define the format for tailored printing
E	Edit the record
X	Finished with the record; allow new (or edited) record to be saved or continue search
Z	Abort this entry and return to main menu. In Search mode, the search will be terminated, but definitions will not be lost, nor will files on disk be altered. Not available in Data Entry Mode.

Select a complete copy of your record by pressing 'A'.

Press 'S' for a Summary of the Record. The following will be printed:

0) RECORD
1) CATEGORY
2) SUBJECT
3) AUTHOR : NAME : ARCHITECT : ARTIST
4) TITLE : ADDRESS : BUILDING NAME : ARTWORK TITLE

A tailored printout of the Record is obtained by pressing 'T'. You must have previously defined the elements you want for this option to actually get you anything.

Tailoring is defined at the same point in the program as other print and display options are selected. Once you have specified a definition, it will be saved in memory (not on disk) until you either redefine it or end the program.

To select this option, press 'D'. At the bottom of the screen you will see displayed:

"ENTER YOUR ELEMENT NUMBERS IN THE ORDER YOU WANT THEM PRINTED. ENTER A NEGATIVE NUMBER TO END THE LIST (RANGE 0 TO 17)"

Using Table 2, select the element numbers you desire to have printed, and then type in each one, *in the order you want them printed.* You must press ENTER after each number is entered. To conclude the list, type in "-1" or any number less than 0. The display for page 0 will then reappear, and you can select any of the regular options.

Text Editing

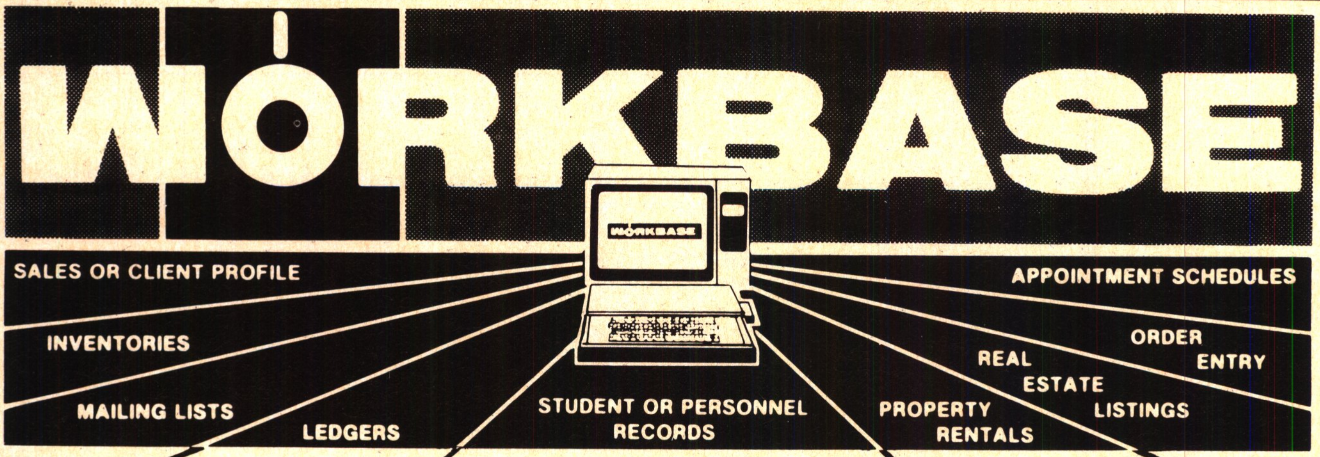
Sooner or later, you are going to make a mistake. Even if it's later, you may still want to enter revisions to record entries. As you will see, this is very easily done either from the data input mode or the search mode.

The technique used is a simplified version of the text editor available from Extended Color BASIC. The following commands are available:

C Change a character
D Delete a character
I Insert characters
H Hack off the rest of the line and allow additions
S Search for the first occurrence of the character
Right Arrow or Space Bar — Move the cursor one space to the right
Left Arrow — Move the cursor one space to the left
Enter — (1) Concludes Insert and Hack and, (2) Completes Editing

To use the editor, you must first get to the editing mode. This is reached from the page displays by typing 'E'. The screen will clear and you will be asked for the line number (from Table 1) which will be edited. As a reminder, you will also be given the record number being modified.

Select the line number you wish to change, type it in and press ENTER. The screen will clear again and will show the original, unchanged line near the top. At about the center of the screen, on the lefthand side, you will see a black rectangle. This is your cursor, and it always sits on top of the current character being worked on. You will only be able to



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see that part of the entry to the left of the cursor. You can use the Right Arrow or Space Bar to move the cursor to the right. The Left Arrow backspaces. By typing 'C' followed by a letter, you can change the character underneath the cursor. If you type 'S' followed by a letter, the cursor will go to the first place that character appears to the right of the cursor. If the character does not appear, the cursor goes to the end of the line.

Insert and Hack are somewhat different in use. They use the BASIC *LINE INPUT* command, and so you will see your black cursor, as well as the BASIC flashing cursor. The black cursor is the position where your new entry starts!

So, in order to insert some new text in the middle of an entry, press 'I'. You will see the flashing cursor appear, and you can type in the new text. You end the Insert by pressing ENTER. Hack works in the same way, except that everything from the cursor to the end of the element is deleted, and your new text is added on the end.

When you have completed your changes, press ENTER and a new screen will appear. If your entry was modified to be longer than allowable, then it will be shortened to fit automatically.

Upon completion of editing, the screen will allow you the same options that are available upon completion of a record entry, so you can choose to review, save, or erase your edited record.

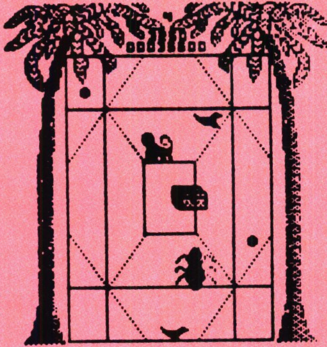
160	221	1100	127
340	88	1240	245
540	213	1380	28
650	125	1580	96
770	74	2000	48
950	7	END	58

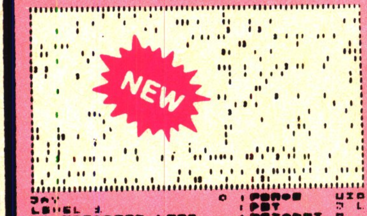
The listing:

```
10 'jinfile, 30 JAN 83.
11 'v1.1, 24 APR 83.
12 'R.C. WEIR
13 'N-14 COLONY APTS.
14 'EPHESUS CHURCH RD.
15 'CHAPEL HILL, NC 27514
20 CLEAR 5000:CLS
30 PRINT@10,"jinfile v1.1
    BY robert weir, JANUARY 198
3"
50 FILES 1, 1570
60 DIM LN(17),N$(17),NM$(3,17),L
ST$(2,2),FL(2),TL(17),PS(1,26),P
P(6),PX(3,17)
67 FOR X=0 TO 17
69 READ LN(X):NEXT
73 FOR X=0 TO 3
75 FOR Y=0 TO 17
77 READ NM$(X,Y)
79 NEXT Y,X
81 FOR X=0TO3:FORY=0TO17:READ PX
(X,Y):NEXT Y,X
83 FOR X=0 TO 1:FOR Y=0 TO 26:RE
```

Megamunk

100% machine language fast action game. As a soldier / monkey you must save the forest of Ledonia from the evil mammoth spiders, avoid the falling coconuts, save the sacred birds and recover Ledonia's treasure. Megamunk has 11 different screens with multiple colors and "four voice" music. Joysticks required.
32K cassette $21.95
32K disk $23.95





METABOT

100% machine language strategy game. You are surrounded by Metabots. Each time you take a step, they each take a step. You must lure them into the electric fences and acid pots. Great fun for ages 8 and up. The whole family can play! Joysticks NOT required.
32K cassette $18.95
32K disk $20.95

Dog-gone it.
I wish I could play
Megamunk!

THE PUZZLER will create crossword puzzles, wordsearch puzzles and wordscramble puzzles. It will printout the puzzle to any dot addressable printer or Okidata series 80 printer. 100% machine language. Great for school or church classrooms.
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1OKEY turns a portion of your keyboard into a numeric keypad. Turn on **1OKEY** or return to normal keyboard with a single keystroke. Sure makes numeric data entry easier. Reviewed in Oct. 84 **RAINBOW.**
16K cassette $17.95
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COLOR DESIGNER and your CoCo can create amazing hi-res color pictures. Create over 1000 color/texture combinations in **PMODE4.** Written in Extended Basic with machine language subroutines. April '84 **RAINBOW** . . . "I would not hesitate to recommend Color Designer to someone in the market for a graphics editor."
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32K disk $25.95
OKIDUMP is hi-res screen dump for hi-res CoCo pictures to Okidata series 80 printers. 100% machine language. Includes hints on printing pictures of hi-res game screens.
16K cassette $8.95
16K disk $10.95
AMORTIZE IT is possibly the best amortization program available for CoCo. Even allows entry of additional principal payments.
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32K disk $13.95
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If you're looking for the finest terminal software you can buy, look no further! And now we've added a **high-res screen** display that gives you 32 by 16, 42, 51, or 64 by 24 lines.* And you can switch between the high-res screen and the normal screen ***without*** destroying what you have in the buffer! **+PLUS+** we have a buffer editor, complete up and down load support, on-line cassette or disk reads and writes, off-line and on-line scrolling, pre-entry of data before calling, word wrap, buffer printing, selective printing, change **any** parameter so you can communicate with **any** other computer. You can send and receive Basic programs, ASCII file, as well as machine code, **+PLUS+** you can save your buffer to tape (Tape or Rom version) or disk (Disk version). You can communicate with the local **BBS, Compuserve™, The Source™,** the main frame at work or school, other color computers, Apples, IBM PC'S, TRS-80 Model I, II, III, IV, 12, 16, 100, or any other computer via RS-232.

Compare these features with ***any*** other terminal program:

32×16, 42, 51, 6×24 Screen
Communications BAUD Rate: 110-19200
Printer Baud Rate: 600-9600
Select Half or Full Duplex.
Select Odd, Even, or no Parity.
Select 7 or 8 Bit Words.
Send Control Characters.
Send a True Line Break.
Separate Keys for Escape and Rubout.
Select All Caps If Needed.
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NOW WITH 42, 51 OR 64 CHARACTERS BY 24 LINES!

Scroll Protect Up to 9 Lines.
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Select Printer Line Feeds If Needed or Ignore All Line Feeds in Buffer.

*Disk and Rom Pack only (not on tape). PRICE: $29.95 (TAPE) $39.95 (ROM PACK) $39.95 (DISK)

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DOUBLE SWITCH II — Same as the above switch box, but we have added three RCA jacks, and a switch which allows you to switch between your 80 column board output, and your computer output at a touch instead of unplugging $39.95

VIDEO SWITCH — Switch between your 80 column board, and your computer's output. Two **LEDs** display the device $19.95

DOUBLE CABLE — If you don't have a lot of money to spend, you can hook a modem and a printer up at the same time using this Y-Cable. Works with most printers $14.95

WORD PAK (80 Column Board) — This is one of the finest pieces of hardware to come along since the CoCo. Allows you to display a real 80 column screen, not the graphics that are sometimes difficult to read. Comes with a software driver that will interface basic into the 80 column board $139.95

Y-CABLE — Used with the **WORD PAK** when disk drives are being used. Not needed if you own some type of multi-port device, the Multi-Pak interface for instance $29.95

DOUBLE DRIVER — Best video driver available for the Color Computer. Made by our friends at Moreton Bay Software. Specify regular CoCo or CoCo II $24.95

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NEW AND IMPROVED

DOUBLE DOS II

NEW AND IMPROVED!! Double Dos II is an enhanced version of our original **DOUBLE DOS** program. The original Double Dos was so well received that we decided to add even more capabilities, and fix some of the limitations in the original program. With Double Dos you can use 35, 40 or 80 track (double and single sided) drives all on one system, all at the same time. (The use of double sided drives will limit you to three drives.) Works with all types of 5¼ or 3 inch drive systems and All commands are supported in Double Dos! Double Dos is totally transparent to your basic programs! If your system selection is 80 tracks, a **FREE** command will return 158 granules! Compare this to the 68 granules your system now returns. You get 78 granules with a 40 track drive, 10 more than the 35 track system. **EVERY** command in basic is supported by Double Dos. There is only one limitation, you can only open any number of files to one drive at a time, otherwise everything else is the same. Plus you get some great new commands!! Look at what Double Dos will allow as new disk basic commands:

BAUD 1-6 ... change the **BAUD** rate with a command, no pokes!
TRACK 35,36,40,80 ... change the number of tracks.
DOUBLE ... enable the double sided option.
PDIR ... print your directory to the printer.
DUMP ON/OFF ... send a basic program to a friend without using a terminal program!
RATE 6,35 ... change the head stepping rate.
VIDEO ON/OFF ... will give you a reverse screen without a hardware modification.
SCROLL 1-255 ... change the screen scrolling speed.
COMMAND ... will list all new commands.
DUPE 0-2 ... will allow copy & backup from one side of a disk to the other side on double sided systems!
DATE ... you can enter the month, day, and year which will be stored in the directory of your disk each time you save a program or file, and you can see it when you use the DIR command! Very useful when looking for the most current file or program!

AND, all commands can be used inside basic programs because they have been added to disk basics list of commands! You also get full reset protection, which means that you will stay in the 64K mode until you power-down.

PRICE: $29.95 (DISK ONLY) 64K Required

NEW

REAL EIGHTY-COLUMN DISPLAY!

NEW

ULTRA TERM +

PROFESSIONAL PROFESSIONAL PROFESSIONAL PROFESSIONAL

This program is the **ultimate** in coco communicating!! ***Ultra* Term +** is used with a plug-in 80 column board* that gives you **True** 80 columns, not the graphics display that is unreadable at 80 columns. This is truly a ***Professional*** Package that is so easy to use that once you have used it, you'll wonder why other packages are so difficult to use, (except for Color Term + Plus + that is!) After using a terminal program that cannot give you **True** mainframe terminal emulation, you will find ***Ultra* Term +** indispensable! ***Ultra* Term +** even has a host mode that allows you to echo characters like full duplex mainframes do! There are also 10 macro keys which will allow you to save passwords, phone numbers, modem programming information, etc. + PLUS + you can save them to disk. Also, like all ***Professional*** terminal programs you can save your current parameters. This saves you set up time when moving from one system to another. +Plus+ when used with the parallel printer port** you can print what is coming in. And what about documentation? Every feature is explained in detail and indexed for fast look up! There is also a comprehensive help section to aid those unfamiliar with telecommunications. Although this program was designed for the Professional a total novice can use it with ease. Check all the features listed below and then you decide who has the world's smartest terminal!.

Baud Rates: 110-4800 (communicate)
600-9600 (printer).
Screen Format: 80 x 25 w/true upper & lower case.
Select half, full duplex or echo.
Select odd, even, mark, space or no parity.
Send all 128 characters from keyboard.
Select 7 or 8 bit words.
Select 1 or 2 stop bits.
Send a true line break.
Select all caps if needed.
Automatic capture of incoming files.
X on/X off capabilities.
Merge text or programs in buffer.
53,000 character buffer (64**K**).
Send and receive BASIC, FILES and machine code.
10 macro keys.
Four buffer send modes (dump, prompted, manual & time delay).
Buffer size indicators (bytes used & bytes remaining).
Buffer editor w/auto key repeat.
Scroll forward & reverse to view buffer & print viewed screen option.
Selectable printer formats (line feeds, etc.).
Selectable trapping of incoming characters.
Print while receiving data*
Buffer editor has these features:
Move forward and reverse through buffer. Insert, type over, delete lines or characters.
Block deletion or start to end of buffer delete.
Save and load macros.
Save and load parameters.
Use 1-4 disk drive (w/SAVE, LOAD, DIR. & granule display).
Easy to use MENU driven format.
Comprehensive users manual.
Works with **ALL** Radio Shack™ Disk Systems and **all** models of color computers.

Still not convinced? How about a 15 day, money back guarantee? If you don't like the package for any reason, we will refund your money upon return of a like-new package.† Who out there is offering you this kind of deal? And customer support was never better. Simply fill out your registration card and send it back to us and you will be notified when new features, improvements, etc. become available because all registered owners will receive **Free** upgrades for a $5.00 shipping and handling fee).

As with all good Professional programs, ***Ultra* Term +** is **all machine code.** This program has been tested by those both familiar and unfamiliar with communications programs. And when you call for some technical support, you **won't** get an answering machine during our business hours (10-5 CST M-Sat.) under normal circumstances. Technical help is usually available all day.

PRICE: *Ultra* Term + — $55.95 (Disk)
Word·Pak (80-column board; includes a software driver so you can use your basic programs with no modification in most cases!). . . . **$139.95** + $3.00 S&H
Y-Cable. . . **$29.95** (Required if expansion port not used with disk drives)
Complete Package ***Ultra* Term +**, Word·Pak & Y Cable [subtract $20.00 if not needed] is only **$210.00**

*****Ultra* Term +** supports the 80 column board made by PBJ, Inc. If you already have the board, simply order the program, but those of you who don't can get a good deal.

**Parallel Printer Port from PBJ, Inc.

†Less $10.00 restocking charge.

DOUBLE SPOOLER

Tired of waiting for your listings? printouts? etc.? This is THE Spooling Program!! No need to save your programs in ASCII. You can also spool your files and you can spool **ANYTHING** you print on the screen while a program is running! Requires a minimum of 32K **AND** the 64K computer can spool really **LARGE** files!! Plus more!! PRICE: $19.95 (Tape) $21.95 (Disk)

DOUBLE MAILER

At last a powerful, easy to use, mailing list program for a reasonable price. Up to 200 names can be held in memory for you to change, modify, search or print as you like. Plus, you can print out up to 1800 names without touching the keyboard. Save **thousands** of names on each disk. The machine language sort routine will sort 200 names in as little as 6 seconds! Supports single or double wide labels. Three and four line labels can be intermixed without leaving gaps in your listings! All menu driven, and easy to use. Printer support gives 600-9600 **BAUD** selection, and different print sizes if you wish. 16K Extended

NEW

Double 80 Plus

NEW

Announcing a **BREAK-THROUGH!** Now you can own an 80 column board for $99.95. And you can choose the software you want to buy instead of being charged for something you don't want. Y-Cable available for use with disk drives. Look at these features and compare:

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PRICES:	**DOUBLE 80 PLUS** (80 column board)	$99.95
	Y-CABLE	29.95
	BASIC DRIVER	12.95
	OS9 DRIVER	12.95
	FLEX DRIVER (available soon)	12.95
	ULTRA TERM+ (disk only)	55.95

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1983

NOW . . .
V-PRINT
A utility to print directory on paper
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You Bet! There are empty spaces in your 32K and 64K CoCo. The Preble VDOS Un-DISK helps you fill them up with PROGRAMS!

- Un-DISK uses your computer's extra memory like a fast disk drive.
- Un-DISK can store BASIC and MACHINE LANGUAGE programs.
- Un-DISK is INVISIBLE. Yup! Un-DISK does not interfere with normal Color Computer Operation.
- Un-DISK appears only when you type the magic word VDOS.
- Un-DISK comes with comprehensive instructions which you may not need because:
- Un-DISK is self-prompting and easy to use!
- Un-DISK is provided on cassette.
- Un-DISK is faster than a slow clumsy DISK DRIVE and best of all . . .
- Un-DISK is CHEAPER than a DISK DRIVE!
- Un-DISK will work even if you already own a disk but WHY BUY A DISK AT ALL?
- Un-DISK should be in the library of every serious CoCo user even if you own a disk says Frank J. Esser, independent reviewer for RAINBOW Magazine!

OK sure, disk drives ARE NICE. I own one. But if your finances are limited, the Un-DISK can give you much of the power of the mechanical drive. Even if you already own a disk the Un-DISK can work like a super fast extra disk.

EXTRA . . . EXTRA . . . EXTRA . . . EXTRA . . .
Additional Power For $14.95

Only with VDUMP for the Un-DISK!

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```
AD PS(X,Y):NEXT Y,X
140 FOR X=0 TO 6:READ PP(X):NEXT
145 FOR X=0TO17:TL(X)=-1:NEXT X
150 CLS:PRINT@10,"jinfile v1.1":
PRINT"       MASTER FILING SYSTEM
":PRINT:PRINT"INSERT DATA DISK,
PRESS <enter> WHEN READY";:INPUT
 I$
160 PRINT@167,"KEY RETRIEVAL MOD
E"
170 PRINT:PRINT"        D   DATA IN
PUT                     R   RECORD
SEARCH                  S   SEARCH
WITH DEFINITIONS        P   SEARCH
WITH PRIOR                  DEFINIT
IONS"
190 I$=INKEY$:IF I$="" THEN 190
200 ON INSTR(1,"DRSP",I$) GOTO 1
290,310,680,800
205 GOTO 150
220 '      find end of file
230 OPEN "D",#1,"BIBLIJIN/DAT",1
570
240 RK=LOF(1):CLOSE #1:RETURN
250 '      get file
260 OPEN "D",#1,"BIBLIJIN/DAT",1
570
270 GET #1,RECK:FOR X=0 TO 17
280 LINE INPUT #1,N$(X):N$(X)=MI
D$(N$(X),2,LEN(N$(X))-2):NEXT X
290 CLOSE #1:RETURN
300 '      retrieval
310 CLS:PRINT@2,"  known record
retrieval       ENSURE CORRECT
DATA DISK IS    IN BEFORE PROCE
EDING."
320 PRINT"  ENTER RECORD NUMBER"
;:INPUT I$
330 I$=RIGHT$(I$,3):RECK=VAL(I$)
:GOSUB 230
340 IF RECK>RK OR RECK<1 THEN PR
INT@355,"IMPROPER ENTRY, (";RECK
;") REDO":GOTO 320
350 GOSUB 260:GOSUB 380:PRINT:PR
INT "ANOTHER RECORD";:INPUT I$
360 IF LEFT$(I$,1)="Y" THEN 310
ELSE 150
370 '      page 0
380 TV$=": ":I$=LEFT$(N$(1),1)
400 A=INSTR(1,"BPSA",I$)-1
410 FOR X=6 TO 14:IF NM$(A,X)="N
A" THEN N$(X)=" ":NEXT X
420 CLS:I=0:GOSUB 620
430 '      key in request
440 I$=INKEY$:IF I$="" THEN 440
450 IF I$="0" THEN I=0:GOSUB620:
GOTO440
460 I=VAL(I$):IF I>0 AND I<6 THE
N CLS:IF I=1 THEN GOSUB 620:GOTO
 440 ELSE GOSUB 640:GOTO440
470 ON INSTR(1,"ASETDXZ",I$) GOT
O 510,590,1080,1020,940,490,490
480 GOTO 440
490 RETURN
500 '      print all
510 PRINT:PRINT "PREPARE PRINTER
,  <enter> WHEN  READY";:INPUT B
$
520 FOR Y1=0 TO 17:Y=PX(A,Y1):IF
 Y<0 THEN 530
525 GOSUB 550
530 NEXT Y1:PRINT#-2,STRING$(75,
61),STRING$(2,13):GOTO420
540 '      print format
550 IF NM$(A,Y)="NA" THEN RETURN
 ELSE PRINT #-2,USING "%
              %";NM$(A,Y);:PRINT#-
2," :     ";
551 '         G1 AND G2 ARE UNDERL
INE CODES FOR LP VIII/DMP 200
552 G1=1:G2=1:TN$=N$(Y):IF Y=4 T
HEN G1=15:G2=14
555 IF LEN(TN$)<53 THEN PRINT#-2
,CHR$(G1);TN$;CHR$(G2):GOTO 570
560 TN=INSTR(35,TN$," "):IF TN=0
 THEN TN=52
562 PRINT#-2,CHR$(G1);MID$(TN$,1
,TN);CHR$(G2)
565 TN$=MID$(TN$,TN):IF LEN(TN$)
<55 THEN PRINT#-2,TAB(26);CHR$(G
1);TN$;CHR$(G2) ELSE PRINT#-2,TA
B(26);:GOTO 560
570 RETURN
580 '      print summary
590 PRINT:PRINT"PREPARE PRINTER,
  <enter> WHEN  READY";:INPUT B$
600 FOR Y=0 TO 4:GOSUB 550:NEXT
Y:PRINT#-2,STRING$(75,126),STRIN
G$(2,13):GOTO 420
610 '      page 0 and 1
620 CLS:PRINT@0,"RECORD: ";N$(0)
;" / ";
630 '      all pages
```

DISK UTILITIES

AUTO-EXEC This ML program adds an auto-start feature to any disk based ML program. All subsequent disk copies retain auto-start feature. NOT for BASIC programs. Tape copies of modified program will not auto-start. Plus info on RESET button disable. 16/32K

BACK-WABBIT is a ML disk BACKUP utility for those who only have 1 drive. Copies 35 or 36 tracks. FAST. Does not copy dead tracks. Reads & writes six tracks in 28 seconds. Displays track/sector being copied. Gives error reports, then continues BACKUP. Requires 32K. Both require CoCo & R. Shack drive. On DISK **$17.50** each, both programs **$31.50**, Missouri residents add 6% tax. **GARLAND SOFTWARE**

P. O. BOX 23043 ST. LOUIS, MO. 63156

```
640 FOR Y1=PP(I) TO PP(I+1)-1:P=
I
645 IF PS(0,Y1)>2 AND PS(0,Y1)<6
 THEN PRINT@PS(1,Y1),STRING$(95,
32);
650 PRINT@PS(1,Y1),NM$(A,PS(0,Y1
));TV$;N$(PS(0,Y1));
660 NEXT Y1:RETURN
670 '      search
680 CLS:PRINT"READ INSTRUCTIONS
CAREFULLY TO  ENSURE GOOD SEARCH
."
690 FOR XR=0 TO 2:FOR YR=0 TO 2:
LST$(XR,YR)="XXX":NEXT YR,XR
700 PRINT "SPECIFY CATEGORY/SUBC
ATEGORY     (USE 'X' TO INDICATE
ALL FOR     EITHER OR BOTH)";:INP
UT P$
710 PRINT:Y=0
720 PRINT"ENTER EXCLUSIVE GROUP
NBR";Y+1:X=0
730 INPUT LST$(X,Y):IF LST$(X,Y)
="" THEN LST$(X,Y)="XXX"
740 X=X+1:IF X<=2 AND LST$(X-1,Y
)<>"XXX" THEN 730
745 IF LST$(X-1,Y)="XXX" AND X=1
 THEN 760
750 Y=Y+1:IF Y<=2 THEN 720
760 Y=Y-1:IF Y<0 THEN 150 ELSE L
LEN=Y
770 PRINT "enter lines to search
"
780 FOR X=0 TO 2:INPUT I$:FL(X)=
VAL(I$):NEXT X
790 IF P$="" THEN P$="XX" ELSE I
F LEN(P$)=1 THEN P$=P$+"X" ELSE
P$=LEFT$(P$,2)
800 PRINT #-2,"CATEGORY/SUBCATEG
ORY: ";P$
810 FOR Y=0 TO LLEN:PRINT #-2,"E
XCLUSIVE GROUP NBR";Y+1:FOR X=0
TO 2:PRINT #-2,LST$(X,Y):NEXT X,
Y
820 PRINT#-2," ":RECK=0:GOSUB 23
0
830 RECK=RECK+1:IF RK<RECK THEN
150 ELSE GOSUB 260
840 IF LEFT$(P$,1)<>"X" AND LEFT
$(P$,1)<>LEFT$(N$(1),1) THEN 830
850 IF RIGHT$(P$,1)<>"X" AND RIG
HT$(P$,1)<>MID$(N$(1),2,1) THEN
830
860 Y=0
865 X=0:F1=0:F2=0:F3=0
870 F1=INSTR(N$(FL(X)),LST$(0,Y)
)
880 F2=INSTR(N$(FL(X)),LST$(1,Y)
)
890 F3=INSTR(N$(FL(X)),LST$(2,Y)
)
900 IF F1>0 OR F2>0 OR F3>0 THEN
 920
910 X=X+1:IF X>2 THEN 830 ELSE 8
70
920 Y=Y+1:IF Y<=LLEN THEN 865
925 GOSUB 380:IF I$="Z" THEN 150
 ELSE 830
930 '      define tailoring
940 PRINT:PRINT "ENTER YOUR ELEM
ENT NUMBERS IN   THE ORDER YOU W
ANT THEM PRINTED.ENTER A NEGATIV
E NUMBER TO END  THE LIST (RANGE
 0 TO 17)
950 FOR X=0 TO 17:INPUT TL(X):IF
 TL(X)<0 OR TL(X)>17 THEN 970
960 NEXT X:LOOP=20
970 FOR X=0 TO 17:IF TL(X)<0 THE
N LOOP=X-1:GOTO 990
980 NEXT X
990 IF LOOP<0 THEN 420 ELSE IF L
OOP>17 THEN LOOP=17
1000 GOTO 420
1010 '      print tailor
1020 PRINT:PRINT "PREPARE PRINTE
R, <enter> WHEN  READY";:INPUT B
```

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```
$
1030 IF LOOP<0 THEN PRINT "not d
efined": GOTO 420
1040 FOR X=0 TO LOOP:Y=TL(X):IF
Y>=0 THEN GOSUB 550
1050 NEXT X
1060 PRINT#-2,STRING$(75,42),STR
ING$(2,13):GOTO 420
1070 '      text editor
1080 CLS:PRINT"ENTER LINE NUMBER
 TO CORRECT     TYPE ANY LETTER T
O QUIT":INPUT I$
1090 P1=VAL(I$):IF P1<1 OR P1>17
 THEN 420
1100 CLS:PRINT@8,"** text editor
 **":KT=1:M$=" "+N$(P1)+" ":L$="
":R$="":V$=CHR$(128)
1110 PRINT@32,N$(P1)
1120 PRINT@223,M$:PRINT@223+KT,V
$;
1130 C$=INKEY$:IF C$="" THEN 113
0
1135 P2$="HDCI "+CHR$(9)+CHR$(8)
+CHR$(21)+"S"+CHR$(13)
1140 ON INSTR(1,P2$,C$) GOTO 115
0,1155,1160,1180,1170,1170,1190,
1190,1220,1230
1145 GOTO 1120
1150 M$=LEFT$(M$,KT):LINE INPUT
B$:M$=M$+B$+" ":KT=KT+LEN(B$):GO
TO 1120
1155 M$=LEFT$(M$,KT)+MID$(M$,KT+
2):GOTO 1120
1160 B$=INKEY$:IF B$="" THEN 116
0 ELSE MID$(M$,KT+1,1)=B$:IF KT=
LEN(M$)-1 THEN 1120 ELSE KT=KT+1
:GOTO 1120
1170 IF KT=LEN(M$)-1 THEN 1120 E
LSE KT=KT+1:GOTO 1120
1180 LINE INPUT B$:M$=LEFT$(M$,K
T)+B$+MID$(M$,KT+1):KT=KT+LEN(B$
):GOTO 1120
1190 IF KT=1 THEN 1120 ELSE KT=K
T-1:GOTO 1120
1220 B$=INKEY$:IF B$="" THEN 122
0 ELSE G=INSTR(KT+1,M$,B$):IF G=
0 THEN 1120 ELSE KT=G-1:GOTO 112
0
1230 IF LEN(M$)<3 THEN N$(P1)=M$
:GOTO 1250
1240 M$=MID$(M$,2):N$(P1)=LEFT$(
M$,LEN(M$)-1)
1250 IF LEN(N$(P1))>LN(P1) THEN
N$(P1)=LEFT$(N$(P1),LN(P1))
1260 PRINT@224,N$(P1)
1270 GOTO 1650
1280 '      start data input
1290 CLS:PRINT"          data inp
ut              FOR CREATING DA
TA FILES":GOSUB 1500:GOTO 1570
1300 '       SCREEN DISPLAY
1310 CLS:PRINT@2,"CATEGORY:   ";N
M$(A,0):PRINT@34,"RECORD:     ";N
$(0):PRINT@66,"ENTRY:       ";NM$(
A,Y):PRINT@98,"LENGTH:      ";LN(Y
)
1320 PRINT@416,STRING$(32,198):P
RINT@382-LN(Y),STRING$(34,198);:
RETURN
1330 '        LONG ENTRY OVER LENG
TH
1340 GOSUB 1310:LINE INPUT N$(Y)
1350 IF N$(Y)="" THEN N$(Y)="NO
ENTRY"
1360 IF LEN(N$(Y))>LN(Y) THEN GO
SUB 1310:PRINT@448,"ENTRY TOO LO
NG, SAVED AS ABOVE";:N$(Y)=LEFT$
(N$(Y),LN(Y)):PRINT@416-LN(Y),N$
(Y):FOR D=1 TO 2000:NEXT D
1370 RETURN
1380 '         SHORT ENTRY OVER LE
NGTH
1390 GOSUB 1310
1400 LINE INPUT N$(Y):IF N$(Y)="
" THEN N$(Y)="NO ENTRY"
```

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All programs are on cassette, documented, and use 32K ECB PMODE 3 graphics. Reviews have been or will be published in this magazine.

UNDER DEVELOPMENT: GOLF-NET, GOLF-CAP, COCO-CPM and, for model train buffs, SKEDULER.

```
1410 IF LEN(N$(Y))>LN(Y) THEN GO
SUB 1310:PRINT@448,"ENTRY TOO LO
NG, REDO";:PRINT@416-LN(Y),"";:G
OTO 1400
1420 RETURN
1430 '       STORE DATA ON DISK
1440 IF RECK<1 THEN 1710 ELSE OP
EN "D",#1,"BIBLIJIN/DAT",1570
1450 FOR X=0 TO 17:WRITE #1,N$(X
):NEXT
1460 R1=VAL(RIGHT$("00"+STR$(REC
K),3))
1470 PUT #1,R1
1480 CLOSE #1:GOTO 1650
1490 '       CHECK FOR LAST RECO
RD ON DISK.
1500 OPEN "D",#1,"BIBLIJIN/DAT",
1570
1510 RK=LOF(1)+1:CLOSE #1
1520 IF FREE(0)>1 THEN 1550
1530 CLS:PRINT@34,"** disk full
**";:PRINT@66,"INSERT ANOTHER DI
SK";:PRINT@98,"PRESS <ENTER> WHE
N READY"
1540 INPUT A$:GOTO 1500
1550 PRINT@130,"ENTER DISK NUMBE
R";:INPUT A:RECK=RK+A*1000:N$(0)
=STR$(RECK):RETURN
1560 '       DETERMINE MAIN AND
SUB CATEGORY CODES
1570 PRINT"ENTER CATEGORY/SUBCAT
EGORY CODE":INPUT N$(1):A=0
1580 IF N$(1)="" THEN 1570 ELSE
IF LEN(N$(1))<>2 THEN 1570
1590 B$=RIGHT$(N$(1),1):A$=LEFT$
(N$(1),1)
1600 A=INSTR(1,"BPSA",A$)-1:IF A
<0 THEN 1570
1610 FOR Y1=2 TO 17:Y=PX(A,Y1):I
F Y<1 THEN 1650
1620 IF Y<6 OR Y>14 THEN GOSUB 1
340 ELSE GOSUB 1390
1630 NEXT Y1
1640 '       DATA ENTRY COMPLETE
1650 CLS:PRINT@38,"data entry co
mplete              FOR RECORD
";RECK:PRINT@106,"KEY OPTION":PR
INT:PRINT"     S    SAVE FILE ON
 DISK          R    REVIEW ENTRY
"
1660 PRINT"     X    FINISHED DA
TA ENTRY       N    INPUT NEW E
NTRY"
1670 B$=INKEY$:IF B$="" THEN 167
0 ELSE IF B$="S" THEN 1440 ELSE
IF B$="R" THEN GOSUB 380:GOTO 16
50
1680 IF B$<>"X" AND B$<>"N" THEN
 1650 ELSE PRINT @352,"HAS FILE
BEEN SAVED ON DISK YET?YOU ARE A
BOUT TO ERASE MEMORY.  TYPE 'S'
TO SAVE, 'X' TO         CONTINUE"
;
1690 INPUT C$:C$=LEFT$(C$,1):IF
C$="S" THEN 1440 ELSE IF C$<>"X"
 THEN 1650
1700 IF B$="N" THEN 1290 ELSE 15
0
1710 PRINT"RECORD NUMBER ERROR -
 PROGRAM ABORT":INPUT I$:GOTO 42
0
2000 REM
2005 DATA 5,2,250,250,115,50,32,
32,12,10,30,30,20,8,25,220,220,2
20
2010 DATA BIBLIOGRAPHY,CATEGORY,
SUBJECT,AUTHOR,TITLE,JOURNAL,PLA
CE OF PUB.,PAGES/PUBLISHER
2015 DATA DATE,VOLUME,ILLUSTRATI
ONS,LOCATION,CALL NUMBER,NOTES/C
OURSE,VALUE(YEAR),COMMENTS(1),CO
MMENTS(2),COMMENTS(3)
2020 DATA PEOPLE,CATEGORY,SUBJEC
T,NAME,ADDRESS,POSITION,NA,NA,DA
TE,NATIONALITY,NA,INSTITUTION
2025 DATA PHONE NUMBER,NOTES,NA,
COMMENTS(1),COMMENTS(2),COMMENTS
(3)
2030 DATA STRUCTURES,CATEGORY,SU
BJECT,ARCHITECT,BUILDING NAME,TY
PE(STYLE),DRAWINGS - INSTIT.,HEI
GHT,DATE,MATERIAL
2035 DATA DRAWINGS - CITY,LOCATI
ON,FILE NUMBER,NOTES/SLIDES,DRAW
INGS - TYPE,COMMENTS(1),COMMENTS
(2),COMMENTS(3)
2040 DATA ARTWORK,CATEGORY,SUBJE
CT,ARTIST,ARTWORK TITLE,COUNTRY,
NA,DIMENSIONS,DATE,MEDIUM,NA,LOC
ATION
2045 DATA FILE NUMBER,NOTES/SLID
ES,DRAWINGS - TYPE,COMMENTS(1),C
OMMENTS(2),COMMENTS(3)
2050 DATA 0,1,2,3,4,5,6,7,8,9,10
,11,12,13,14,15,16,17,0,1,2,3,4,
11,12,5,9,8,13,15,16,17,-1,-1,-1
,-1,0,1,2,3,4,5,8,9,7,11,6,14,10
,12,13,15,16,17,0,1,2,3,4,9,8,11
,5,7,12,13,14,15,16,17,-1,-1
2055 DATA 1,2,3,4,5,10,9,8,13,12
,1,2,11,12,13,8,9,3,4,5,7,14,6,1
0,15,16,17,15,32,128,192,256,320
,384,416,448,480,15,32,320,384,4
16,448,480,0,288,416,0,96,192,28
8,0,256,0
2060 DATA 0,10,17,20,24,26,27
```

Now you're gonna catch it!

Football Fever

Part One of a two-part series.

By Fred B. Scerbo
Rainbow Contributing Editor

(Editor's Note: If you have an idea for the Wishing Well, submit it to Fred c/o THE RAINBOW. *Remember, keep your ideas specific, but don't forget that this is* BASIC. *All programs resulting from your wishes are for your use but remain the property of the author.)*

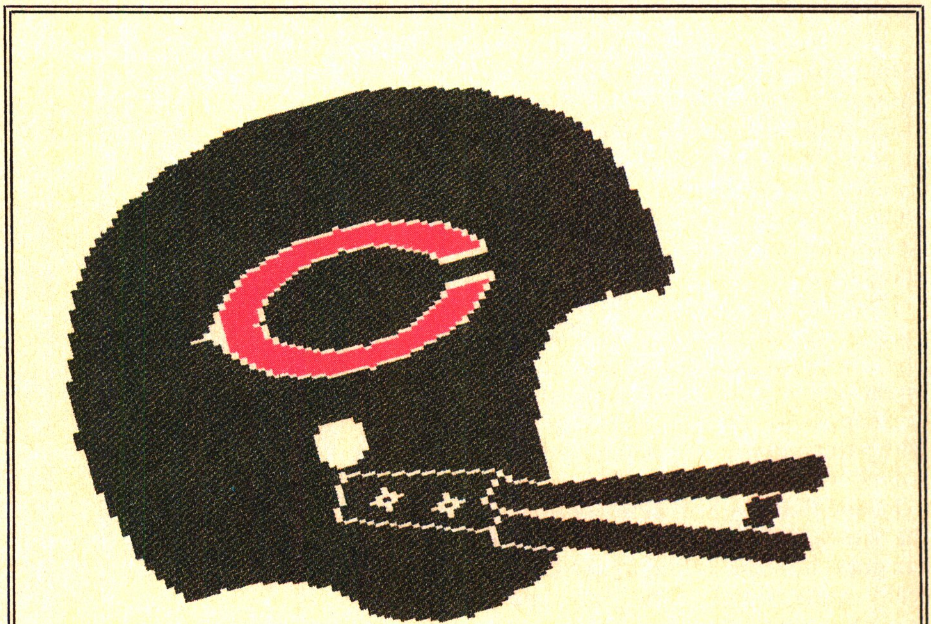
Well, the mail has really started to come in at a steady pace with ideas and wishes. This month's program (as well as next month's) is a combination of a number of wishes. Sorry that these require 32K. I'll give you 16K folks some hints a little later, but this would be a great time to go the up-grade route (and the RAINBOW ON TAPE route for those who don't yet get it).

Before we get down into the body of this month's wish, you'll notice something about this month's column: it's a little shorter than usual. There are two reasons for this. First, since this is in two parts covering *all* the NFL football teams, there would be no sense in giving the same technical information both months. Therefore, some of the more technical aspects of these listings will be covered next month.

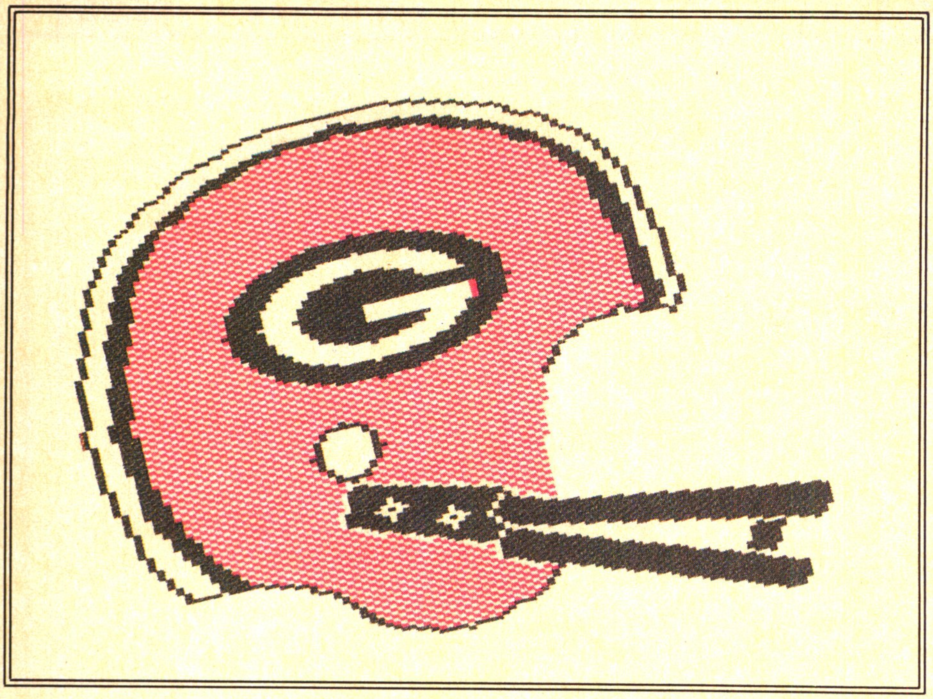
The Wish

Ever since *Rockfest* and *Baseball Fever*, I have gotten many requests for requests for repeats, especially for the remaining baseball teams. Have no fear, the remaining teams will appear by spring. It would be rather foolish to put them out now.

Since fall is here, why not do the football teams for the NFL? Well, one person's wish suggested that I do the team helmets. Great idea! The natural



(Fred Scerbo is a special needs instructor for the North Adams Public Schools. He holds a master's in education and published some of the first software available for the Color Computer through his software firm, Illustrated Memory Banks.)



advantage is that such listings could have some common subroutines, such as those that draw the empty helmet shell. Compared to *Baseball Fever*, this task was easier.

The Task

As you will recall from some of our other graphic experiments, I have tried a number of newer tricks to get other than your standard red, blue, black and white color set in *PMODE 4* to *PMODE 3* without changing the *SCREEN* command. We even experimented by poking around location 178, but that can give rather striped results.

What we would need with our NFL helmets would be a way to get the extra colors of yellow, purple, gold, silver and green while still in *PMODE 4*. Sound impossible? Not really! If you've played *Sands of Egypt* or some of the new graphic Adventures I have seen, you will find yellow sand and a light blue sky in many cases.

How do they do this? Take a close look at the screen when yellow or light blue or purple is generated, and you might get a clue as to how this is accomplished. (If you were an artist with paint and you only had the primary colors, what would you do?)

I hope that you will closely examine the screen and the listing to see if you can guess how the technique works. It is really quite simple. The only one I haven't completely conquered is green, so we will go the *POKE178* route for that one.

The technique used does not allow for easy *PAINTing*, so we are storing the patterns in an array with *GET* and displaying them with the *PUT* command. The catch is that we use *OR* rather than *PSET* with the *PUT* command. The result is that you will see our new colors actually work like the *PAINT* command does. You may also have to slightly adjust your tint since I have seen some people's TVs that are a little off in adjustment of tint. You will like these colors more than the standard four. More on this next month.

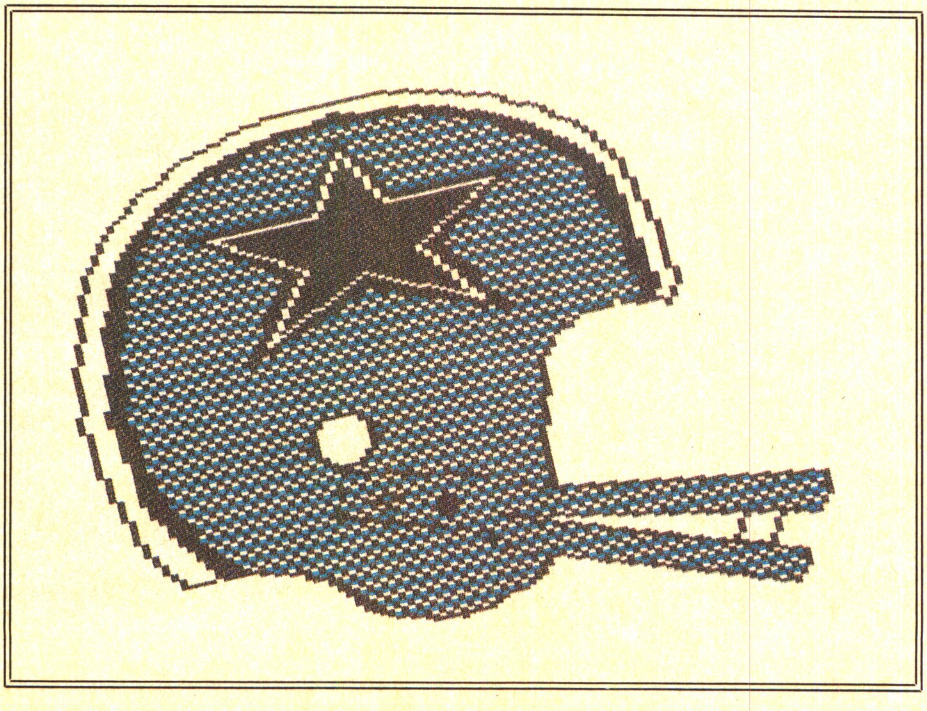
The Program

The popularity of *Baseball Fever* had to do with the fact that a menu could be used to select any team. This program has included this feature as well as an automatic display which will continually flip through all the teams. There is a third feature which really makes these programs a lot of fun. I have merged part of the *Screen Quiz* program from a previous "Wishing Well." Therefore, the third option will randomly paint a helmet and then give a multiple choice quiz at the bottom of the screen. Can you guess all the teams?

I have greatly streamlined the quiz so as to not include the lowercase letters, thus saving some memory and typing. Be very careful to type all data accurately. When people write in about bugs in these programs, it is almost always the data.

To use this program, on running it, you will see a large colorful 84. The eight is one color and the four is another, either red or blue. Press the number which is RED and you will have the proper color set. (I prefer this to pressing the reset button.)

Your next choice is A) Automatic, B) Individual or C) Quiz. When the helmets are on automatic, pressing ENTER will *reRUN* the program. Pressing ENTER on individual helmets will return you to the menu. If you take the quiz, you must go all the way through it, and get your score, or press 'S' to stop. You can

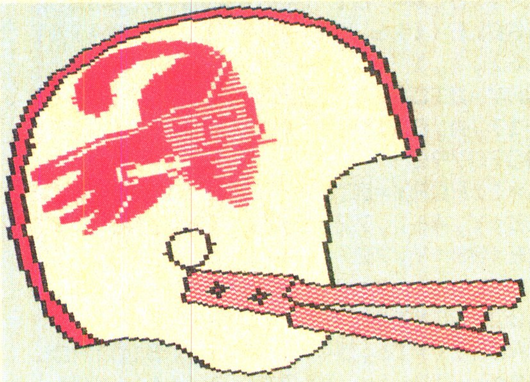


reRUN or end the program by pressing 'Y' or 'N'.

For 16K ECB

Those of you who want shorter versions can try typing in just the lines for each helmet. There is one catch. You must include Lines 70 - 200, and Lines 540 - 570, as well as any other subroutines which a given helmet might use. (You'll be able to tell when you are missing one.) Also include *210 GOTO 575*. This will prevent you from running into the subroutines. If you must include other subroutines, jump over them with a *GOTO* statement.

I think that you will find these graphics to be very interesting. See if you can figure out how the colors are created and I'll share the secrets next month. Most of all, keep those wishes coming in, but remember, only the best ideas will reach these pages.



180	87	1610	230
480	115	1710	116
810	53	1810	254
1010	105	5050	112
1330	43	5290	186
1410	157	5500	205
1490	27	END	26

The listing:

```
10 '******************************
20 '* FOOTBALL FEVER 84 PART 1 *
30 '*      BY FRED B. SCERBO     *
40 '* 149 BARBOUR ST.N.ADAMS.MA*
50 '*    COPYRIGHT (C)  1984     *
60 '******************************
70 CLEAR500
80 CLS0
90 PMODE4,1:PCLS1:SCREEN1,1
100 CIRCLE(128,92),126,0,.45
110 PMODE3:FORX=0TO86STEP86:CIRC
LE(64,46+X),40,3,.8:CIRCLE(64,46
+X),54,3,.8:NEXTX:PAINT(64,10),3
,3:PAINT(64,96),3,3
120 COLOR2,2:LINE(220,4)-(234,17
0),PSET,BF:LINE(140,4)-(154,90),
PSET,BF:LINE(140,90)-(256,104),P
SET,BF
130 X$=INKEY$:IFX$="8"THEN140ELS
EIFX$="4"THEN150ELSE130
140 Z=0:R=3:B=2:GOTO160
150 Z=1:R=2:B=3:GOTO160
160 REM START COLOR SET
170 PMODE4,1:PCLS0:SCREEN0,1:DIM
A(50),B(50),G(50),S(50),P(50):CL
S0:LINE(32,0)-(204,1),PSET,B
180 FORX=31TO203STEP4:PSET(X+Z,0
,0):PSET(X+2+Z,1,0):PSET(X+Z,4):
PSET(X+2+Z,5):NEXT:GET(32,0)-(20
4,1),A,G:GET(32,4)-(204,5),B,G
190 PCLS:FORX=32TO204STEP8:PSET(
X+Z,0):PSET(X+4+Z,1):LINE(X+Z,10
)-(X+1+Z,10),PSET:LINE(X+4+Z,10)
-(X+5+Z,10),PSET:LINE(X+2+Z,11)-
(X+3+Z,11),PSET:LINE(X+6+Z,11)-(
X+7+Z,11),PSET
200 PSET(X+1+Z,20):PSET(X+Z,21):
PSET(X+5+Z,21):NEXTX:GET(32,10)-
(204,11),S,G:GET(32,0)-(204,1),G
,G:GET(32,20)-(204,21),P,G
210 CLS0:PMODE4,1:PCLS1:SCREEN0,
1:PMODE3:CLS0
220 CLS:PRINT@67,"FOOTBALL FEVER
 '84  PART 1"
230 PRINT:PRINTTAB(4)"NATIONAL F
OOTBALL LEAGUE"
240 PRINT"  NATIONAL FOOTBALL CO
NFERENCE"
250 PRINT:PRINTTAB(7)"BY FRED B.
 SCERBO"
260 PRINTTAB(6)"COPYRIGHT  (C) 1
984"
270 PRINT:PRINTTAB(5)"A) AUTOMAT
IC DISPLAY"
280 PRINTTAB(5)"B) INDIVIDUAL DI
SPLAY"
290 PRINTTAB(5)"C) QUIZ ON TEAM
HELMETS"
300 X$=INKEY$:IFX$="A"THEN510ELS
EIFX$="B"THEN310ELSEIFX$="C"THEN
5010ELSE300
310 CLS:PRINT:PRINTTAB(7)"A) LOS
 ANGELES"
320 PRINTTAB(7)"B) MINNESOTA"
330 PRINTTAB(7)"C) GREEN BAY"
340 PRINTTAB(7)"D) CHICAGO"
350 PRINTTAB(7)"E) SAN FRANCISCO
"
360 PRINTTAB(7)"F) ATLANTA"
370 PRINTTAB(7)"G) ST. LOUIS"
380 PRINTTAB(7)"H) DALLAS"
390 PRINTTAB(7)"I) NEW ORLEANS"
400 PRINTTAB(7)"J) PHILADELPHIA"
410 PRINTTAB(7)"K) DETROIT"
420 PRINTTAB(7)"L) WASHINGTON"
430 PRINTTAB(7)"M) NEW YORK"
440 PRINTTAB(7)"N) TAMPA BAY"
450 X$=INKEY$:IFX$=""THEN450
460 IFX$=CHR$(13)THEN RUN
```

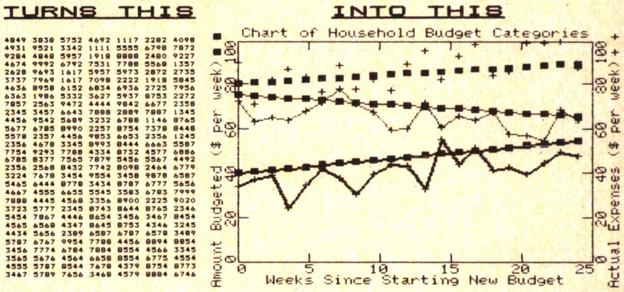
```
470 IF X$<"A" THEN 450 ELSE IF X
$>"N" THEN 450
480 XX=ASC(X$)-64:ON XX GOSUB590
,670,760,850,920,1010,1080,1170,
1250,1370,1450,1520,1640,1720
490 X$=INKEY$:IFX$=CHR$(13)THEN3
10
500 GOTO490
510 FORXX=1TO14:ON XX GOSUB590,6
70,760,850,920,1010,1080,1170,12
50,1370,1450,1520,1640,1720
520 FORK=1TO900:IFINKEY$=CHR$(13
)THEN RUN ELSE NEXTK
530 NEXTXX:GOTO510
540 CIRCLE(118,46),80,BL,.6,.55,
.95:CIRCLE(88,72),56,BL,1.3,.39,
.6:CIRCLE(147,68),56,BL,1.3,.92,
.02:CIRCLE(184,88),26,BL,.7,.55,
.85
550 DRAW"BM160,84"+BL$+"D8L2D8L2
D18M-12,-4H4M-40,-10M-4,+12M+40,
+14NE4D4M+80,+28E4U4M-80,-28H4NE
6F4M+86,+18E4U6M-72,-12BM+58,+20
M-4,+8M-9,-2M+4,-8"
560 CIRCLE(124,124),34,BL,.7,.1,
.4:CIRCLE(60,144),40,BL,.6,.71,.
96:CIRCLE(102,92),10,BL,.9:RETUR
N
570 CIRCLE(110,110),4,W,.9:CIRCL
E(126,116),4,W,.9:RETURN
580 'LOS ANGELES
590 PMODE4,1:PCLS1:SCREEN1,1:PMO
DE3:GOSUB600:GOTO610
600 BL=1:BL$="C1":GOSUB540:CIRCL
E(128,68),80,1,.8,.24,.9:CIRCLE(
128,78),56,1,.8,.36,.98:CIRCLE(1
08,96),26,1,.8,.77,.1:CIRCLE(112
,100),40,1,.65,.77,.1:RETURN
610 PMODE4:PAINT(128,28),0,0:PAI
NT(148,100),0,0:PMODE3
620 FORY=4TO124STEP2:PUT(32,Y)-(
204,Y+1),A,OR:NEXT:GOSUB600
630 PMODE4:PAINT(128,4),0,0:PAIN
T(128,70),0,0
640 W=0:GOSUB570
650 RETURN
660 'MINNESOTA
670 PMODE4:PCLS1:SCREEN1,1:PMODE
3:BL=1:BL$="C1":GOSUB540
680 PAINT(128,6),1,1
690 CIRCLE(138,60),24,4,.8,.74,.
45:DRAW"BM138,42C4M-68,-6M-14,-6
M+10,+20M+60,+20":PAINT(138,50),
4,4:FORX=1TO3:CIRCLE(138,59+X),3
2,R,.8,.95,.4:NEXTX
700 FORY=0TO154STEP2:PUT(32,Y)-(
204,Y+1),P,OR:NEXT:GOSUB540
710 GOTO730
720 PAINT(110,106),2,3:PAINT(150
,122),2,3:PAINT(150,134),2,3:PAI
NT(210,140),2,3
730 W=1:GOSUB570
740 RETURN
750 'GREEN BAY
760 PMODE4,1:PCLS1:SCREEN1,1:PMO
DE3:BL=1:BL$="C1":GOSUB540:GOSUB
780:CIRCLE(116,54),40,1,.5:PAINT
(128,16),1,1
770 FORY=0TO154STEP2:PUT(32,Y)-(
204,Y+1),A,OR:NEXT:GOSUB540:GOSU
B780:GOTO790
780 BL=1:FORY=0TO2:FORX=0TO1:CIR
CLE(118+Y,46),72-X,BL,.6,.53,.97
:CIRCLE(88+Y,72),48-X,BL,1.3,.35
,.6:CIRCLE(147+Y,68),48-X,BL,1.3
,.92,.02:NEXTX:NEXTY:RETURN
790 CIRCLE(116,54),40,1,.5:CIRCL
E(116,54),32,1,.5:PAINT(116,72),
1,1:CIRCLE(116,54),20,1,.5:PAINT
(116,54),1,1
800 PMODE4:LINE(116,54)-(152,50)
,PRESET,BF:LINE(116,54)-(146,58)
,PSET,BF
810 PMODE3:PAINT(110,106),1,1:PA
INT(150,122),1,1:PAINT(150,134),
1,1:PAINT(210,140),1,1:BL$="C4":
GOSUB550
820 W=4:GOSUB570
830 RETURN
840 'CHICAGO
850 PMODE4,1:PCLS1:SCREEN1,1:PMO
DE3:BL=1:BL$="C1":GOSUB540:PAINT
(128,16),1,1
860 CIRCLE(116,54),40,4,.5:CIRCL
E(116,54),28,4,.5:PAINT(116,72),
R,4
870 PMODE4:LINE(144,58)-(154,50)
,PSET,BF:LINE(140,52)-(158,56),P
RESET,BF:PMODE3:DRAW"BM78,54C4NL
8L4NE4NF4UR2"
880 PMODE3:PAINT(110,106),1,1:PA
INT(150,122),1,1:PAINT(150,134),
1,1:PAINT(210,140),1,1:BL$="C4":
GOSUB550
890 W=4:GOSUB570
900 RETURN
910 'SAN FRANCISCO
920 PMODE4,1:PCLS1:SCREEN1,1:PMO
DE3:BL=1:BL$="C1":GOSUB540:GOSUB
780:CIRCLE(116,36),42,1,.5:PAINT
(128,12),1,1
930 FORY=0TO154STEP2:PUT(32,Y)-(
204,Y+1),G,OR:NEXT
940 BL=R:FORY=0TO2:FORX=0TO2:CIR
CLE(118+Y,46),72+X,BL,.6,.53,.97
:CIRCLE(88+Y,72),48+X,BL,1.3,.35
```

```
,.6:CIRCLE(147+Y,68),47+X,BL,1.3
,.92,.02:NEXTX:NEXTY
950 BL=1:BL$="C1":GOSUB540:CIRCL
E(116,36),36,1,.5:PAINT(128,18),
1,1:PAINT(128,30),R,1
960 DRAW"BM120,22C4D4L2H2L2H2L4D
NR6DL2NR6UL2DL2DL2DL2D2RNU2D2RNU
6NR18DNR20R2DR20ND4LND6LD6L18UNR
6UL2R6L8ND3ULND4BUBR16R4DNL3DNL2
"
970 DRAW"BD4D8LNU8LNU8LNU8NL4R10
L6U2L2U4R12ND2UNL12UNL12NU2BU6NR
10DR10D2"
980 PMODE3:PAINT(110,106),1,1:PA
INT(150,122),1,1:PAINT(150,134),
1,1:PAINT(210,140),1,1:BL$="C4":
GOSUB550:W=4:GOSUB570
990 RETURN
1000 'ATLANTA
1010 PMODE4,1:PCLS1:SCREEN1,1:PM
ODE3:BL=1:BL$="C1":GOSUB540
1020 BL=1:CIRCLE(118,46),72,BL,.
6,.53,.97:CIRCLE(88,72),48,BL,1.
3,.35,.6:CIRCLE(147,68),48,BL,1.
3,.92,.02:PAINT(128,12),R,1
1030 DRAW"C4BM134,14L44M-12,+24M
+18,-10R2M-6,+12M+10,-6M-10,+6D8
NE10D2M+2,+8M+10,-16M-10,+16M+6,
+10M+8,-20M-8,+20M+14,+10NU24M+1
6,+6U2M-6,-8U38R8D4F4"
1040 DRAW"U4R4F8U10M-24,-10U4R10
E2NL4R14UH2L2H2L6H2UL12":PAINT(1
28,16),1,4:DRAW"ND30BD3BR8R"
1050 PMODE3:PAINT(110,106),B,1:P
AINT(150,122),B,1:PAINT(150,134)
,B,1:PAINT(210,140),B,1:BL$="C4"
:GOSUB550:W=4:GOSUB570
1060 RETURN
1070 'ST.LOUIS
1080 PMODE4,1:PCLS1:SCREEN1,1:PM
ODE3:BL=1:BL$="C1":GOSUB540:GOSU
B1090:GOTO1100
1090 CIRCLE(95,90),40,1,.5,.76,.
95:DRAW"BM95,70C1M-6,-10H2L2H2L2
H2L2H2U2H2U2H16R4H4U2R2F4R2U2H4U
4R2F2R2F2M+20,+4R30":CIRCLE(116,
40),26,1,.6,.77,.95:RETURN
1100 DRAW"BF12BR12NU2F2NUD2M+20,
+10M-20,+10M-12,+20M+12,-20H8M+8
,-12":PAINT(144,56),1,1
1110 FORY=40TO60STEP2:PUT(82,Y)-
(254,Y+1),A,OR:NEXT:DRAW"M-8,+12
F8M+20,-10NL22M-20,-10NU2":GOSUB
1090:PAINT(74,30),R,1:GOSUB1090
1120 DRAW"BF16BR8M-20,-6L16M+8,+
4D8R2D4R2D4F8D14":PAINT(130,76),
1,1:CIRCLE(132,44),6,4,.7,.1,.6
1130 PAINT(110.106).B,1:PAINT(15
0,122),B,1:PAINT(150,134),B,1:PA
INT(210,140),B,1:W=4:GOSUB570
1140 GOSUB540
1150 RETURN
1160 'DALLAS
1170 PMODE4,1:PCLS1:SCREEN1,1:PM
ODE3:BL=1:BL$="C1":GOSUB540:GOSU
B780:GOSUB1180:GOTO1190
1180 DRAW"BM118,10C1M+12,+18R34M
-24,+16M+14,+22M-36,-14M-36,+14M
+14,-22M-24,-16R34M+12,-18":RETU
RN
1190 PAINT(128,10),1,1:PAINT(110
,106),1,1:PAINT(159,122),1,1:PAI
NT(150,134),1,1:FORI=0TO162STEP4
:PUT(32,I)-(204,I+1),S,OR:PUT(33
,I+2)-(205,I+3),B,OR:PUT(64,I)-(
236,I+1),S,OR:PUT(65,I+2)-(237,I
+3),B,OR:NEXTI
1200 BL=1:GOSUB550:W=1:GOSUB570
1210 BL=1:BL$="C1":GOSUB540:GOSU
B780:GOSUB1180:PAINT(120,20),1,1
1220 DRAW"BM118,14C4M+10,+16R30M
-24,+14M+14,+18M-30,-14M-30,+14M
+14,-18M-24,-14R30M+10,-16":GOSU
B1180
1230 RETURN
1240 'NEW ORLEANS
1250 PMODE4,1:PCLS1:SCREEN1,1:PM
ODE3:BL=1:BL$="C1":GOSUB540:GOSU
B780:W$="C1":W=1:GOSUB1260:GOTO1
310
1260 DRAWW$:DRAW"BM116.16NR2F2D2
R2D4R2D6R2D8R2E2BM116,16NL2G2D2L
2D4L2D6L2D8L2H2"
1270 CIRCLE(92,42),16,W,.7,.4,.9
:CIRCLE(140,42),16,W,.7,.6,.1
1280 CIRCLE(92,50),16,W,.5,.5,0:
CIRCLE(140,50),16,W,.5,.5,.99:CI
RCLE(116,54),14,W,.6,.9,.15:CIRC
LE(116,54),14,W,.6,.37,.6
1290 DRAW"BM118,72NG2R2U2R2U4R2F
2R8E2U6L2G2L6H2U2BM112,72NF2L2U2
L2U4G2L8H2U6R2F2R6E2U2"
1300 RETURN
1310 PAINT(128,12),1,1
1320 FORY=0TO154STEP2:PUT(32,Y)-
(204,Y+1),G,OR:NEXT
1330 PAINT(116,30),1,1:W$="C4":W
=4:GOSUB1260:GOSUB540:GOSUB780
1340 PAINT(110,106),1,1:PAINT(15
0,122),1,1:PAINT(150,134),1,1:PA
INT(210,140),1,1:BL$="C4":GOSUB5
50:W=4:GOSUB570
1350 RETURN
1360 'PHILADELPHIA
1370 PMODE4,1:PCLS1:SCREEN1,1:PM
ODE3:BL=1:BL$="C1":GOSUB1380:GOT
```

```
01390
1380 DRAW"C1BM200,58M-30,-20M-12
,-9L20M-9,-2L2M+10,+8D2M-40,-8L2
D2M+16,+8M-16,-2M+22,+10M-14,-2D
2M+16,+6D2L8M+18,+6R4E2R2F4R4E2R
2F4R4E2R2E6F8R6E2R2F2R14U10":RET
URN
1390 PAINT(196,60),1,1:FORY=24TO
74STEP2:PUT(32,Y)-(204,Y+1),S,OR
:NEXT:GOSUB540:GOSUB1380
1400 DRAW"C1BM198,48L2M-30,-20M-
8,-4L30M-16,-4F10M-40,-8M-12,-6L
2D2M+20,+15M-16,-4L2D2M+24,+12M-
16,-2L2D2M+30,+10L10D2M+30,+10D4
R6E2R2F4R4E2R2F4R4E2R2E6F8"
1410 PMODE3:PAINT(110,106),1,1:P
AINT(150,122),1,1:PAINT(150,134)
,1,1:PAINT(210,140),1,1:GOSUB540
1420 POKE178,153+Z:PAINT(128,6),
,1:BL$="C4":GOSUB550:W=4:GOSUB57
0
1430 RETURN
1440 'DETROIT
1450 PMODE4,1:PCLS1:SCREEN1,1:PM
ODE3:BL=1:BL$="C1":GOSUB540:GOSU
B1460:GOTO1480
1460 DRAW"BM150,38R4F2R2E2UE2HL8
U2E2R2DR4DR2DR4E2U2H4M-8,-3U2M-8
,-4U4M-10,-4L2D2M-8,-2L2D2L2G4L4
D2L4D2L4D4L4D2L2D2L2D2F2G2F2G2F4
G10M-18,+6L2H4M-6,-20U4H2L4G6D2R
4E2M+6,+20D2F4R2M-6,+16"
1470 DRAW"G4D4F2D4F2R6E2U2H2U2M+
12,-10U2F2D2G2D2F2R8E2R2F2R2F2R4
U4H2L2H2L2U2M+16,-6U2E2H2E2R2E2R
2E2F4R2E2F2RE2F2RE2M+20,+4E2R2U2
H2L6M-20,-6M+6,-2M+20,+2E2UH2L10
UL6H2UE2":RETURN
1480 PAINT(128,4),1,1:PAINT(110,
106),1,1:PAINT(159,122),1,1:PAIN
T(150,134),1,1:FORI=0TO162STEP4:
PUT(32,I)-(204,I+1),S,OR:PUT(33,
I+2)-(205,I+3),B,OR:PUT(64,I)-(2
36,I+1),S,OR:PUT(65,I+2)-(237,I+
3),B,OR:NEXTI
1490 GOSUB540:GOSUB1460:PAINT(12
8,12),1,1:DRAW"C4":GOSUB1460:W=4
:GOSUB570:W=1:GOSUB570
1500 RETURN
1510 'WASHINGTON
1520 PMODE4,1:PCLS1:SCREEN1,1:PM
ODE3:BL=1:BL$="C1":GOSUB540:GOSU
B1530:GOTO1550
1530 BL=1:CIRCLE(118,46),72,BL,.
6,.53,.97:CIRCLE(88,72),48,BL,1.
3,.35,.6:CIRCLE(147,68),48,BL,1.
3,.92,.02
1540 CIRCLE(110,44),34,1,.8:CIRC
LE(110,44),40,1,.8:DRAW"BM80,24C
1G16M-4,+20L2D20R2D20R2D16E8U12N
G10NU60D16R2D4R2D4R4U4R2U4R2NU50
U16H4D8G4H4":RETURN
1550 PAINT(76,110),1,1:PAINT(66,
108),1,1:PAINT(110,16),1,1
1560 PMODE3:PAINT(110,106),1,1:P
AINT(150,122),1,1:PAINT(150,134)
,1,1:PAINT(210,140),1,1:BL$="C4"
:GOSUB550
1570 DRAW"C1":GOSUB1580:GOTO1590
1580 CIRCLE(110,40),24,1,.7,.55,
.85:DRAW"C1BM124,30F4D2M+4,+6D2L
4D2F2NL5D6L6M-8,+4D6M-12,-4L8E2U
2E2U4L4D2L2D2L4U2L2U4E2U2G4L2U8E
4R2ND8L2E4R4D18R6NF12R4NF8R2U6R2
U8L2U6E2R12D2":RETURN
1590 PAINT(114,40),1,1:PAINT(106
,56),1,1
1600 FORI=0TO162STEP2:PUT(32,I)-
(204,I+1),A,OR:PUT(64,I)-(236,I+
1),A,OR:NEXTI:BL$="C1":GOSUB540:
GOSUB1530:PAINT(128,10),R,1
1610 GOSUB1580:PAINT(106,40),1,1
:DRAW"BD6NR4NL4R2NG2R2G2BD4NG6L2
G6U4BM76,60D40BL10U64":W=1:GOSUB
570
1620 RETURN
1630 'NEW YORK
1640 PMODE4,1:PCLS1:SCREEN1,1:PM
ODE3:BL=1:BL$="C1":GOSUB540:PAIN
T(128,16),1,1
1650 CIRCLE(118,46),74,4,.6,.53,
.97:CIRCLE(88,72),50,4,1.3,.35,.
6:CIRCLE(149,68),49,4,1.3,.92,.0
2:PAINT(128,2),R,4
1660 DRAW"BM48,76C4M+120,-9U4M-1
20,+9ND4BU8BR2M+6,-26M+16,-2F2M-
1,+8L4U4M-8,+1M-4,+18M+8,-1U4R2U
4L4U3R16M+2,-12R2UR4M-6,+26DL2DL
4M+2,-12L6M-2,+12M-16,+2L2H2U"
1670 DRAW"BR32R2M+12,-26U2R4UR4M
+4,+20RM+4,-20R4UR4M+2,+14R4M+2,
-14M+38,-3F4D6G2L4U6H2L2DL2D8F2R
8F2D8LD2L6DL4H2U6R4D4R4U6L6H2LH2
U9L4M-4,+22L4DLM+4,-22L4DL6M-4,+
22L4DL6M-4,-16M-4,+16DL4DL4M-4,-
10L4DL2M-4,+10NL8M+4,-10BU4E2U2E
2RD6L6"
1680 PAINT(50,74),4,4:PAINT(56,5
4),4,4:PAINT(110,54),4,4
1690 W=1:GOSUB570
1700 RETURN
1710 'TAMPA BAY
1720 PMODE4,1:PCLS1:SCREEN1,1:PM
ODE3:BL=1:BL$="C1":GOSUB540
1730 CIRCLE(118,40),20,1,1.3,.2,
.1:DRAW"BM136,40C1D20M-8,+20L2M-
```

```
20,-14M-2,-10":PAINT(118,20),1,1
:PAINT(118,16),R,4
1740 COLOR4,4:FORI=26TO90STEP2:L
INE(86,I)-(140,I),PSET:NEXT
1750 CIRCLE(100,24),32,R,.5,.45,
.3:CIRCLE(76,26),8,R,.9,0,.6:CIR
CLE(106,26),26,R,.5,.5,.99:PAINT
(76,26),R,R
1760 CIRCLE(115,40),22,R,1.2,.5,
.65:PAINT(98,36),R,R:CIRCLE(118,
40),20,R,1.3,.3,.9
1770 DRAW"BM106,60C"+STR$(R)+"M-
16,+12M-10,+4L4E10L4G8M-10,+4L2E
10M-12,+4L6U2M+12,-4E4U2M-16,+6L
6U2M+16,-8E4L8M-8,+3L4H2U2E2M+30
,-8R14"
1780 PAINT(90,60),R,R:DRAW"BM108
,64NF10UNF10UNF12UNF14UF8R10E8UG
8L10H8NL4U2F8R4UL4H8R2F8R2UL2H8F
4UR6BU4L4NH2R6NE2L4BU4U6H3L6G2R2
BDNL2R4"
1790 DRAW"BR12R6BUH2L6G3BU8R16D8
EU6FD10F2D2G2L2D2NR8L8BL10C4L14H
2L2G2L10H2L4G2D4F2R4E2R10F2R2E2U
NL20UNL20R4DL4U2L20BU14L8M-20,+6
R2M+20,-6R8M+20,-6UR14M+10,-14"
1800 CIRCLE(118,46),74,1,.6,.53,
.97:CIRCLE(88,72),50,1,1.3,.35,.
6:CIRCLE(149,68),49,1,1.3,.92,.0
2:PAINT(128,2),R,1
1810 PAINT(110,106),1,1:PAINT(15
0,122),1,1:PAINT(150,134),1,1:PA
INT(210,140),1,1:BL$="C4":GOSUB5
50
1820 FORI=100TO162STEP2:PUT(64,I
)-(236,I+1),A,OR:NEXTI:BL$="C1":
GOSUB540
1830 W=1:GOSUB570
1840 RETURN
5000 REM QUIZ BODY
5010 PCLS:DIMAA$(90),X(51),R(51)
,AO(50),A$(50),B$(50),NP(50):CLS
0:D=1:M$=","
5020 FORI=0TO250STEP6:K=K+1:X(K)
=I:NEXT:FORP=8TO58:READC$:AA$(P)
=C$:NEXT:GOTO5130
5030 DATA BR2HU3E,BREU3H,BU5BRFN
LNGNENRNF,BU3BR2DNLNRD,BRUNRDRDG
,BRBU2R2,BRRUL,UE3U,BRHNE3U3ERFD
3GL,R2U5NLD5R
5040 DATA NR3UEREUHLG,BUFREUHNLE
UL3,BR3U5D3L3UE2R,BUFREUHL2U2R3,
BUFREUHLGU2ER,BU4UR3D2G3,BUFREUH
LNGHERFG,BRREU3HLGDFRE,BR2UBU2U,
BR2NEUBU2URDLBD3RDG,BR2H2UE2,BRB
UNR2BU2R2,BRE2UH2,BR2UBU2REHL2,,
U2NR3U2ERFD4
5050 DATA U3NR2U2R2FGFDGL2,BUU3E
RFBD3GLH,U5RF2DG2L,NR3U3NR2U2R3,
U3NR2U2R3,BUU3ERBRBD3NLDGLH,U3NU
2R3NU2D3,BRU5,BUFEU4NRL2,U5D2RE2
G2F2D,NU5R3,U5FDRUED5,U5F3U3D5,U
5R3D5L3,U5R2FDGL2,BUU3ERFD3NHNFG
LH,U5R2FGL2F3,BUFREUHL2UERF
5060 DATA BRU5LR3,NU5R3U5,BU5D3F
DRUEU3,NU5EU2RD2FU5,UE2H2BR3DGNL
FD2,BU5D2FRD2NLU2EU2,NR3UE3UL3
5070 IF LEN(JK$)<=42THEN5110
5080 FOR T=42TO0STEP-1:IF MID$(J
K$,T,1)=" "THEN5100
5090 NEXT T:GOTO5110
5100 L$=LEFT$(JK$,T):W$=L$:GOSUB
5120:JK$="      "+RIGHT$(JK$,(LEN(
JK$))-T):GOTO5070
5110 W$=JK$:GOSUB5120:RETURN
5120 SL=LEN(W$):DRAW CC$:FORI=1T
OSL:B$=MID$(W$,I,1):C=ASC(B$)-32
::DRAW"BM"+STR$(X(I))+","+STR$(Y
):DRAW AA$(C):NEXTI:RETURN
5130 REM READ DATA
5140 FORJ=1TO14:READ A$(J),B$(J)
5150 NEXTJ
5160 REM START QUIZ
5170 CC$="C0"
5180 J=J-1
```

GRAFPLOT



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```
5190 FORI=1 TO J
5200 AO(I)=RND(J)
5210 IF NP(AO(I))=1 THEN 5200
5220 NP(AO(I))=1
5230 NEXTI
5240 FOR P=1TOJ
5250 ZW=VAL(A$(AO(P)))
5260 FOR Q=1TO3
5270 C(Q)=RND(J):IF C(Q)=ZW THEN
5270
5280 FOR K=Q-1 TO 0STEP-1:IF C(K
)=C(Q) THEN5270
5290 NEXTK
5300 NEXTQ:C(4)=ZW
5310 FOR E=1TO4
5320 F(E)=RND(4)
5330 FOR K=E-1 TO 0 STEP-1:IF F(
K)=F(E) THEN5320
5340 NEXTK:NEXTE
5350 ON ZW GOSUB590,670,760,850,
920,1010,1080,1170,1250,1370,145
0,1520,1640,1720
5360 PMODE4
5370 Y=166:JK$="    1)  "+B$(C(F(1
))):GOSUB5070
5380 JK$="
 2)  "+B$(C(F(2))):GOSUB5070
```

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```
5390 Y=176:JK$="    3)  "+B$(C(F(3
))):GOSUB5070
5400 JK$="
 4)  "+B$(C(F(4))):GOSUB5070
5410 G$=INKEY$:IFG$="S"THEN5540E
LSEIFG$=""THEN5410
5420 G=VAL(G$)
5430 IF G<1 THEN 5410
5440 IF G>4 THEN 5410
5450 IF C(F(G))<>ZW THEN5480
5460 Y=186:JK$="    CORRECT: THE
ANSWER IS: "+B$(ZW):GOSUB5070
5470 CR=CR+1:GOTO5500
5480 Y=186:JK$="    WRONG: THE AN
SWER IS:"+B$(ZW):GOSUB5070
5490 IR=IR+1
5500 FOR Y=1TO3000:IFINKEY$=CHR$
(13)THEN5520ELSE NEXTY
5510 PCLS
5520 NEXT P
5530 IFCR=J THEN GOSUB 5660
5540 CLS:PRINT:PRINT
5550 J=CR+IR:IF J=0 THEN J=1
5560 PRINT:PRINT:PRINT"     NUMBE
R CORRECT = "CR
5570 PRINT
5580 PRINT"     NUMBER WRONG    =
"IR
5590 PRINT:PRINT"    STUDENT SCO
RE  = ";INT(CR*100/J);"%"
5600 PRINT:PRINT"    ANOTHER TRY
 (Y/N)";
5610 W$=INKEY$:IFW$=""THEN5610
5620 IF W$="Y" THEN RUN
5630 IF W$="N" THEN 5650
5640 GOTO5610
5650 CLS:END
5660 RETURN
5670 RETURN
5680 DATA 1,LOS ANGELES
5690 DATA 2,MINNESOTA
5700 DATA 3,GREEN BAY
5710 DATA 4,CHICAGO
5720 DATA 5,SAN FRANCISCO
5730 DATA 6,ATLANTA
5740 DATA 7,ST.LOUIS
5750 DATA 8,DALLAS
5760 DATA 9,NEW ORLEANS
5770 DATA 10,PHILADELPHIA
5780 DATA 11,DETROIT
5790 DATA 12,WASHINGTON
5800 DATA 13,NEW YORK
5810 DATA 14,TAMPA BAY
5820 DATA END,END
```

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★ **New Number One** ● **Last Month's Number One**

ANDRONE *(Radio Shack)*

27,805	★John Marcogliese, Eastchester, NY
18,290	Bill Sain, Charlotte, NC
17,170	Jamie Schultz, Ontario, Canada

ANNIHILATOR *(Chromasette)*

18,600	★Michael Cooney, Mansfield, OH
1,000	●Matthew Kromeke, Albuquerque, NM

BAG-IT-MAN *(Aardvark)*

418,790	★Cornelius Caesar, Hofheim, West Germany
310,400	Eric Lecrouart, Ottawa, Ontario
109,620	Ronald Gates, Grand Rapids, MI
101,400	Daniel Belisle, Montreal, Quebec
37,110	Stephane Asselin, Hauterive, Quebec

BASEBALL *(Radio Shack)*

460-0	★Walter Trainlips, Janesville, WI
324-0	Michael Rosenberg, Prestonsburg, KY
296-0	Seth Newman, Yardley, PA
223-0	Chris Young, Ft. Worth, TX
176-0	Andrew King, Vancouver, British Columbia
175-0	Bob Dewitt, Blue Island, IL
121-0	Ronald Gates, Grand Rapids, MI
115-0	Eric Anderson, Rockford, IL
83-0	Andy Larson, Omaha, NE
62-0	Blake Borwick, Boone, IA
52-0	Ryan Devlin, Louisville, KY
41-0	Ian Timothy Hicks, Edmonton, Alberta

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3,600	Apollo Latham, Rich Square, NC
3,300	Joey Lewis, Cabin Creek, WV
2,850	Jon Hobson, Plainfield, WI
2,806	Robert Mefferd, Wren, OH
2,600	Joel Lombardi, Newark, DE

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42,000	★Martin Klein, Skokie, IL
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28,720	Perry Denton, New Baden, IL
27,880	Mike Wells, Pittsburgh, PA
24,000	Charlie Salmon, Madison, WI

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6,447,950	★Jon Griffith
5,488,250	Jim Kennett
2,983,350	Blossom Mayor, East Greenwich, NY
2,902,700	Michael Popovich, Nashua, NH
2,087,650	Edmund Greene, Nashua, NH
999,000	Ronald Gates, Grand Rapids, MI
99,200	Andrew Chin, Austin, TX

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451,382	★Randall Edwards, Dunlap, KS
99,516	Tiffany Morgan, Lookout Mtn., TN

CANYON CLIMBER *(Radio Shack)*

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2,326,200	Scott Oberholtzer, Lexington, MA
1,603,400	Shen Mansell, Calgary, Alberta
1,571,300	Jeff Weaver, Gordonville, PA
1,426,600	Sean Whitley, Arvada, CO
74,000	Jeffrey Siebert, Palm Bay, FL

CAVERN COPTER *(*THE RAINBOW*)*

1213	★Doug Schwartz, Glendale, AZ
968	Michael Mefferd, Wren, OH
760	David Figel, Sardis, OH
747	Susan Ballinger, Uxbridge, Ontario
700	Mark Day, Ft. Worth, TX

CAVERNS OF DEATH *(*THE RAINBOW*)*

2100	★Jeff Loeb, Mobile, AL

CHOPPER STRIKE *(MichTron)*

162,400	★Andrew Figel, Sardis, OH
130,200	Benny Pischke, Lloydminster, Saket[illegible]ewan
87,600	David Figel, Sardis, OH
83,300	Doug Masten, Macon, OH
72,100	●Lisa Siclari, Staten Island, NY

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128,210	★Moe Tindell, Sebring, FL
116,475	Jeffrey Kochs, Grove City, OH
116,470	Colin Kerridge, Ladysmith, British Columbia
114,140	Cheryl Pratt, Moab, UT
110,475	Andrew Truesdale, Ferguson, MO

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3,355,248	Scott Drake, Pine City, NY
2,614,230	Jerry Petkash, Warren, MI
2,547,299	Rich McGervey, Morgantown, WV
669,678	Jon Kroll, Greendale, WI

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201,190	Jay Pribble, Davenport, IA
196,090	Randall F. Edwards, Dunlap, KS
94,940	Martin C. Klein, Skokie, IL
49,510	Doug Kleir, Grand Rapids, MI
20,100	Mark Day, Ft. Worth, TX

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1,962	●Michael Rosenberg, Prestonsburg, KY
1,890	Fred Thompson, Saugus, MA

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3,096,900	★Chad Barry, Rochester, NH
3,048,400	Brent Murphy, Mesa, AZ
2,890,000	Rich Van Manen, Grand Rapids, MI
1,762,980	●Michael Rosenberg, Prestonsburg, KY
1,294,300	John Statham, Strathroy, Ontario

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1,080,000	Phillipe Duplanties, St. Jerome, Quebec
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605,890	Peter Sherburne, Highland, CA
474,040	Paul Moritz, Butte, MT
138,048	Ryan Van Manen, Grand Rapids, MI
135,150	Rich Van Manen, Grand Rapids, MI
61,800	Jason Clough, Sulphur Springs, AR

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326,180	George Hoffman, Shavertown, PA
190,840	●Kyle Keller, Overland Park, KS
139,010	Paul MacArthur, Gillette, WI
86,600	James Toth, Punxsutawney, PA
75,040	Barrett Ens, Calgary, Alberta

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1,244,400	●Jack Baran, Bensalem, PA
1,015,000	Kyle Keller, Overland Park, KS

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41,750	Michael Rosenberg, Prestonsburg, KY
35,400	Chad Barry, Rochester, NH
31,750	Liz Baker, Marissa, IL
22,990	Alan Morris, Chicopee, MA
13,135	Andrew Chin, Austin, TX

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97,390	●Sam Hughes, Colton, CA
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84,440	Bill Ide, Newark, DE
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255,000	John Osborne, Kincardine, Ontario

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12	●Kevin Oberberger, Sparks, NV
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10	Michael Mefferd, Wren, OH
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1,220,000	Edwin Prather, Oxnard, CA

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25,949	James A. Lafare, Williamstown, MA
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15,821	Alex Gotovsky, Toronto, Ontario
5,631	Greg Erieau, Columbus, OH

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6,299,300	Scott Oberholtzer, Lexington, MA

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1,410	Brad Lacerda, Gloucester, MA
1,270	●Theodore Latham Jr., Rich Square, NC
1,235	Joey Lewis, Cabin Creek, WV
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184,780	Ray Suplee
181,920	Susan Bennington, Pensacola, FL
130,000	Robert Dickau, Sacramento, CA
6,200	Laura Goldberg, Monroe, CT
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496,165	Evelyn Gagnon, North Bay, Ontario
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50	★Mike Bubb, Grafton, OH
50	★Chris Cope, Central, SC
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88,615	Robbie Anderson, Monrovia, CA
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389,453	★Gary Bachtel, Huntsville, AL
208,602	Robert Buerkle, Conway, PA
188,000	Todd Kaplan, Lawrenceville, NJ
ROBOTTACK *(Intracolor)*	
2,516,050	★Horace Hamilton, Calgary, Alberta
2,437,000	●Mike Scharf, Fremont, OH
2,329,000	Edwin Prather & Cory Soper
2,216,950	Randy Hankins, Tabor, IA
1,922,200	Erik Merz, Noblesville, IN
145,100	David Mount, West Monroe, NY
SANDS OF EGYPT *(Radio Shack)*	
80	★Bob Dewitt, Blue Island, IL
102	Chu-Kia Wang, Madison, WI
SHAMUS *(Synapse Software)*	
72,000	★Todd Kaplan, Lawrenceville, NJ
17,185	Paul MacArthur, Gillette, WI
SHOOTING GALLERY *(Radio Shack)*	
149,940	★Robert Wallace, Waldorf, MD
67,700	Vernell Peterson, Radcliff, KY
44,870	Mark Nichols, Birsay, Saskatchewan
44,480	R. Duguay, St. Bruno, Quebec
35,080	Greg Erieau, Columbus, OH
10,340	Layla Blackshear, Ft. Worth, TX
SKIING *(Radio Shack)*	
05.85	★John Hokpins, Greenville, SC
12.02	Brian Austin, New Salisbury, IN
12.08	Kelly Kerr, Wentzville, MO
13.73	Janell Stroshane, Ashland, WI
21.35	Jean-Claude Taliana, Brossard, Quebec
SKRAMBLE *(Tom Mix)*	
46,440	★Steve Schutjer, Hazel Green, WI
SNAKER (THE RAINBOW*)*	
1:26	★Dan Sobczak, Mesa, AZ
1:59	Baiju Shah, Deep River, Ontario
2:21	Eric Burk, Williamsvill, NY
SPACE INVADERS *(Spectral Associates)*	
47,670	★Donald Williams, Prince George, British Columbia
SPIDERCIDE *(Radio Shack)*	
1,700	★Doug Feinstein, Mobile, AL
1,400	Joel Feinstein, Mobile, AL
STARBLAZE *(Radio Shack)*	
11,000	★Steve Schutjer, Hazel Green, WI
9,700	Robbie Sablotny, Mt. Zion, IL
9,050	Mark Welte, Baxter, TN
6,250	Ronnie Wattanapanich, Sun Valley, CA
STAR TRADER *(Computerware)*	
43 days	★Steve Hartford, Glendale, CA
STELLAR LIFE-LINE *(Radio Shack)*	
33,100	★Kenn Booth, Grand Rapids, MI
TIME BANDIT *(MichTron)*	
413,620	★Doug Seibel, Tumbler Ridge, British Columbia
243,620	●Mark Wooge, Omaha, NE
225,950	Chris Oberholtzer, Lexington, MA
214,850	Sally Naumann, Hailey, ID
129,240	Brian Larrson, Fridley, MN
103,380	Rodney Mullineaux, Gig Harbor, WA

MORE... RAINBOW SCOREBOARD

43,370	Jon Kroll, Greendale, WI
41,340	Chad Barry, Rochester, NH
TOUCHSTONE *(Tom Mix)*	
88,300	★Michael Mefferd, Wren, OH
65,520	●Kevin Marsh, Bokeelia, FL
TRAILIN' TAIL *(*THE RAINBOW*)*	
87,345	★Philip Parent, Smiths Falls, Ontario
76,275	●Michael Rosenberg, Prestonsburg, KY
74,395	Jean-Marc Parent, Smiths Falls, Ontario
33,454	Kenneth Bergenham, Lawton, MI
26,640	Dr. James Peterson, Radcliff, KY
TRAPFALL *(Tom Mix)*	
120,406	★Keith Marsh, Bokeelia, FL
114,642	Eric Lecrouart, Ottawa, Ontario
114,322	David Joyner, Raleigh, NC
113,408	Rich Trawick, N. Adams, MI
112,596	Kanti Dinda, Kingston, Ontario
109,588	Ryan Van Manen, Grand Rapids, MI
TRIPLE YAHTZEE *(Software Factory)*	
2,474	★Robert Larson, Belfair, WA
TUT'S TOMB *(Mark Data)*	
163,060	★Michael McCafferty, Oceanside, CA
158,000	Chris Russo, Miami, FL
121,240	Mickey McCafferty, Oceanside, CA
106,460	Eileen Kaakee, Royal Oak, MI
104,360	Gary Marshall, Layton, UT
79,780	Rodney Mullineaux, Gig Harbor, WA
39,920	Tom Loring, Bridgewater, MA
WACKY FOOD *(Arcade Animation)*	
241,200	★Todd Kaplan, Lawrenceville, NJ
227,900	●Jon Jenkins, Milner, GA
105,100	Stephane Asselin, Hauterive, Quebec
WHIRLYBIRD RUN *(Spectral Associates)*	
516,450	★Dan Shargel, Arroyo Grande, CA
283,100	Nathan Russell, Minco, OK
174,750	George Hoffman, Shavertown, PA
157,000	Hughens Bien-Aime, Montreal, Quebec
104,000	Jeff Connell, Winona, MN
ZAXXON *(Datasoft)*	
2,057,800	★Chris Oberholtzer, Lexington, MA
1,510,000	●James Quadrella, Brooklyn, NY
666,000	Andy Green, Whitehall, PA
401,900	Mike Hughey, King George, VA
370,400	Chris Coyle, Selden, NY
182,700	Brant Putnam, Tucson, AZ
114,000	Kannon Shanmugam, Lawrence, KS
111,100	Liz Baker, Marissa, IL
100,700	Ronald Gates, Grand Rapids, MI
73,400	David Bryan, Kentwood, LA
73,000	Briton Rothrock, Roanoke, VA

— Tamara Solley

SCOREBOARD POINTERS

In conjunction with THE RAINBOW's Scoreboard, we offer this column of pointers for our game-playing readers' benefit. If you have some interesting hints and tips, we encourage you to share them by sending them to the Scoreboard, c/o THE RAINBOW.

'LOOP'-HOLE

Scoreboard:

Here's a tip for playing *Draconian*: *EXECuting* a quick loop will sometimes fool the birds into leaving the screen. Also, when in the higher numbered sectors (five through nine), it is best not to waste time picking up the bonus men until all the prisons are destroyed.

I'm really stumped on *Shenanigans*. I've reached the lady and the snake and I don't know how to pass them. Please write me at 1366 Beverly St., 95521.

Peter Kral
Arcata, CA

Scoreboard:

I have solved *The Amazing Adventures of Karrak*, (THE RAINBOW, Feb. '84). Here are some clues: First, LOOK in SACK, GET POUCH, OPEN POUCH and GET COIN. Then, PUT COIN (it will ask where) and type SLOT.

For the "hall with the holes," THROW SACK (it will ask for a direction) type 'N'. This will help you get through most of game one.

If you have any more problems with *Karrak*, or other Adventures such as *Black Sanctum* or *Shenanigans*, or can offer help with *Sea Quest* or Aardvark's *Pyramid 80*, please write me at 3426 Airway Ave., 63114.

Denise Blackwell
St. Louis, MO

LAMENTING THE WIZARD

Scoreboard:

I am having trouble with the Adventure *Keys of the Wizard*. How do you kill anything? I have played the Adventure over a hundred times, but to no avail. Please help me!

If there is someone who needs help with the Adventure *Calixto Island*, I have all the answers. Write to me at 96 Lions Dr., 19067.

Michael J. Garozzo
Morrisville, PA

DUNGEON DELIVERANCE

Scoreboard:

I have completely solved the Adventure game *Dungeons of Daggorath*. If there is anybody out there who needs help with the magic words needed to incant rings, killing monsters, maps of the five levels or anything else about the dungeons, please send a SASE to 19930 Garnett Court, 95070, and state your problem. I will return your letter as soon as possible. I also need to know where the chest is in *Pyramid*, and would greatly appreciate it if someone could tell me.

Allan Schaffer
Saratoga, CA

TIME WARP

Scoreboard:

I've found that while playing the game *Lancer* you can stop the action (create a pause) by pressing BREAK. You can resume the action by pressing Q, W and the SHIFT keys at the same time.

Also, if you push the SHIFT key and the @ key at the same time when it asks for the player's name, the words "double speed" appear at the bottom of the screen; the game will run a little faster.

Ricky Susfalk
Grand Island, NY

RAINBOW TRIO

Scoreboard:

I have solved three Adventures by THE RAINBOW. They are: *Enrak* (Aug. '83), *The*

Crown of Merro (Feb. '84) and *The Arconiax Assignment* (July '84). I have made maps for all of these Adventures. You can write me at 641 N. Dawn Circle, 85203. I will send you a map for each Adventure.

Dan Sobczak
Mesa, AZ

NEBULOUS DILEMMA

Scoreboard:

I am having trouble with the game *Project Nebula*. I can't figure out how to dock with the space station. If anyone could help, I would be very grateful. You can write me at 856 Hancock Rd., 63385

Kel Kerr
Wentzville, MO

BASE BURGLARY

Scoreboard:

I have a suggestion for stealing home base when playing against the computer in the game *Baseball*: Try stealing it *before* the pitcher throws the ball.

Stephen Blazek
Gainesville, FL

SANCTUM SANCTION

Scoreboard:

If anyone has had any trouble in getting tools from the caretaker in *Black Sanctum*, send a SASE and I will be glad to help.

I need help in getting past the pit and the slot in game one of *Karrak*. If you can help, write me at 4009 32nd Ave. Ct. NW, 98335.

Rodney Mullineaux
Gig Harbor, WA

TU CLUES FOR COMFORT

Scoreboard:

I have some clues for *Raaka-Tu*. To kill the gargoyle, use the poisonous candle. To get out, GO UNDER the altar. After you get out, if you have 25 points, go west twice and north three times, then you will have 50 points.

For those of you who need help on *Bedlam*: when you get in the hall go west all the way until you get to the room where the hook is, get it and go to the cabinet and get the red key with the hook; go outside the shack room and get the green key with the hook. To get out, go out the painted door or use the green key to get out of the storage room.

If anyone can give me a map or some clues to *Sands of Egypt*, please write me at Rt. 1, Box 575, 75124.

Bryan Petray
Eustace, TX

Q-SHORTY

Scoreboard:

I have found a way to make *Q-Nerd* shorter (THE RAINBOW, May '84). There are two pyramids; both parts are the same except there isn't a Q-Nerd on the bottom pyramid.

In Line 11 — Add a *SCREEN 1,0* at the end of the line.

In Line 14 — Delete *IF YP=0 THEN SCREEN 1,0* at the end of the line.

In Line 16 — Delete *SCREEN 1,0* at the end of the line.

In Line 50 — Delete both *SCREEN* statements at the end and beginning of the line.

In Line 55 — Delete *SCREEN 1,0* in the beginning of the line.

Tim Magnusen
Lafayette, IN

TRADING IN

Scoreboard:

I am the happy owner of a 64K CoCo 2 and I am looking for anyone who wishes to trade data tapes for *Dungeons of Daggorath*. My address is General Delivery, 38915.

A. Jason Collins
Bruce, MS

S.O.S.

Scoreboard:

I need help on the non-graphics version of *Mars*. I can't figure out any of Part I. Please help if you can. My address is 1512 Ransom Dr., 32780.

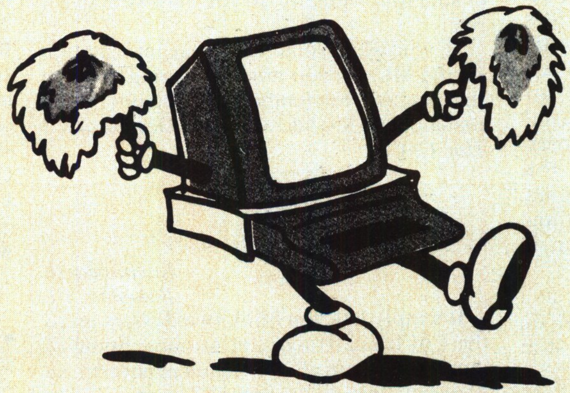
Jason Magoon
Titusville, FL

Scoreboard:

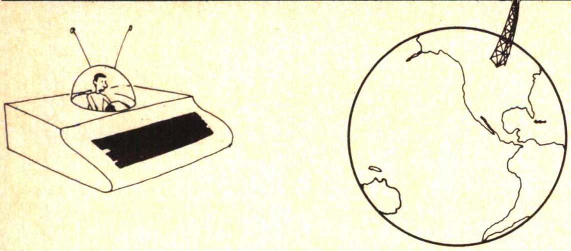
I had a letter in "Scoreboard Pointers" in the Sept. '84 issue of THE RAINBOW regarding several solutions to Adventure games. Since then, there have been some changes made. My phone number is now (904) 785-1599. The list of Adventures I have answers to now is: *Sands of Egypt, Pyramid, Raaka-Tu, Calixto Island, Black Sanctum, Sea Quest* and *Shenanigans*.

If you aren't familiar with the offer, I give complete solutions to those Adventures listed above for $1. Also, if you only need one or two clues, send a SASE and I'll answer, if possible. Send all mail to 2402 Pretty Bayou Drive, 32405.

Ryan Elam
Panama City, FL



EARTH TO ED



The Death Of A Computer... Not Quite

By Ed Ellers
Rainbow Technical Writer

- *I'm very disappointed in [your claim of being] for both CoCo and the MC-10 because it seems that everything you've put in (advertising, programs, hardware, games, etc.) is for the CoCo and not the MC-10. I mean, only some articles are for the MC-10, like one or two programs out of four issues or one cheap game. What about hardware? There are no printers, adapters, disks or anything else being advertised for the MC-10. I know graphics capability and memory are limitations, but there's got to be something out there!*

Mark Foster
Victoria, TX

There are quite a few BASIC programs listed in THE RAINBOW that will work on the MC-10. Your machine has a very close copy of Color BASIC, and nearly all of the same BASIC functions are available. If a program is listed for Color BASIC (no "ECB" in the key box), doesn't use joysticks or tape data files, has no *PEEKs* and *POKEs* (you have the statements, but memory locations are very different) and doesn't need machine language driver programs to work (they won't run as is on the MC-10's 6803 microprocessor), you can use it. You may need a 16K memory expander to run the longer ones; Radio Shack carried this as 26-3013, and your local stores may still have them in stock.

As for hardware, any printer (as far as I know) that works on the CoCo will work on the MC-10, but you can only operate it at 600 Baud; the CoCo can drive a printer at 9600 if the printer and/or interface box can take it. Modems will work as well; Radio Shack sells the Micro Color Compac terminal program, and at least one of our advertisers has an MC-10 "term" program. Those two are about the only peripherals I can think of that would be used on an MC-10 (other than the 16K RAM pack).

The reason that you see very little MC-10 material is that there's very little to print. The people who bought and used the MC-10 were largely newcomers to computing who didn't intend to do a whole lot of programming; conversely, the real "hackers" generally passed it up in favor of the CoCo's greater capabilities. With the MC-10 now officially out of the Radio Shack line, I'm afraid that this trend will continue. The CoCo's price has now come down to less than what the MC-10 and a memory expander sold for originally, so you may want to get one.

If you want some technical information on the MC-10, you might try going through the August, September and October 1983 issues of THE RAINBOW and the October 1983 *Hot CoCo.*

How and "Y"

- *How does a Y-adapter work?*

Kevin Marsh
Bokeelia, FL

It simply lets you hook two devices up to the CoCo's cartridge slot at once. Some of them simply run all of the lines in parallel, so you can only have one device that has a ROM (such as a disk controller), while others have a switch that selects the ROM in one or the other cartridge and blocks out the other.

Unattainable Beauty . . .

- *I've seen some terrific graphics displays on RGB monitors used with some of the other personal computers. I know about the advantages of RGB monitors as opposed to regular video monitors; is there some way to connect them to the CoCo?*

Jerry White
Cleveland, OH

It would be rather difficult to do; the CoCo's 6847 graphics generator chip puts out three signals called Y (the equivalent of a black-and-white signal, which many monitor adapters use) and two "difference" signals called R-Y and B-Y. The MC1372 encoder converts the difference signals into a chroma "subcarrier" and adds that to Y to create the composite color signal. To get R, G and B you would have to have a matrix circuit to recover the original red, green and blue signals, and you would then have an "analog" RGB signal instead of the digital RGB output that most monitors are designed for. You might try using one of the newer monitors that have both RGB and composite inputs; one example is the Panasonic CT-1300D (soon to be replaced by the CTF-1495M). This type of monitor has the kind of resolution that RGB displays require, but provides much the same benefit when using composite video.

Genie Bottleneck

- *We would like to know if the software used on the CoCo is usable on our Colour Genie EG 2000 from EACA Computers of Hong Kong. We will be grateful for your reply.*

Allen N. Leonard
Electric Control Equipment Company
Madurai, India

(Ed Ellers, a RAINBOW *and* PCM *staff member, is a self-confessed electronics fanatic whose other interests include science fiction.)*

The Colour Genie (which is sold primarily in Europe; it hasn't reached the United States that I know of) is a color version of the older Video Genie, a copy of the TRS-80 Model I that was also sold as the TRZ-80, PMC-80 and Dick Smith System 80. From what I've gathered, the Colour Genie is a Model I-type machine that has little in common with the CoCo, so CoCo software won't work on it.

Wear And Tear

• *I have a problem that I think many owners of the older gray CoCos may have. The front of my CoCo's case is scratched from leaning my hands on it. It really looks terrible. I called Radio Shack, but all they said was to get paint from somewhere to touch it up. I tried that, but it doesn't work at all. To top this off, my space bar sticks from having played so many games. Now my CoCo looks terrible and the space bar hardly works. Is there any type of shield (a dark one) I could buy, or does anyone make a paint that matches the CoCo? And is there something I could do to fix my space bar?*

Steven Listonad
Baltimore, MD

On the wearing-away paint job, I'm told that the best paint is an automotive touch-up paint in Mercedes silver-gray(!). Try an auto parts store for it. You might also take the top off, remove the color Computer nameplate (it peels off) and the RAM button (pry up two tabs on the underside), then after you apply the paint to the worn areas, spray the whole top with a clear acrylic spray (such as Krylon). Two or three clear coats should protect the paint.

As for the sticking keys, the only real fix is to take apart the keyboard and clean the parts. This is not something I recommend lightly, as there are twenty-one tiny screws that have to be removed, and the switches are actually fifty-three little springs. Don't try it unless you really know what you are doing.

. . . And Cleaning Up The Trash

• *Our new CoCo has given a rotten picture since the day we got it. Interference shows up on the screen and just won't quit. Is there anything we can do about it?*

Philip Helm
Louisville, KY

Your TV set may have a special 75-ohm coaxial cable jack if it is a color model and is cable-ready (or in many cases, even if it isn't; I've seen this on $170 jobs from Taiwan). It's very easy to plug the CoCo directly into this jack, using an adapter like Radio Shack's 278-255 to connect an RCA-type phono plug to an F-type connector. In many cases, this will clear up the interference. You may have to use, instead of the adapter, a new coaxial cable with an adapter such as the Radio Shack 278-252 to go directly to the CoCo and get rid of its own output cable. I'm using a coax cable with an 'F' connector on one end and a phono plug on the other, and have no trouble even with two computers operating in the room. Sets with two channel selector knobs (one for VHF and one for UHF) may not provide the best results because of insufficient shielding; cable-ready sets as a rule are well shielded to prevent interference problems on cable TV.

The Lock-Up

• *Shortly after the warranty expired (of course!) the computer started to lock up. Sometimes a second cursor will appear, and other times the letters or numbers in column two and 10 change to different letters; the cursor disappears and the keyboard does nothing. I always have to turn the computer off and back on to regain control.*

John Friesen
LaSalle, Manitoba

This is one of the most difficult problems to cure; when it happened to a CoCo belonging to one of our staff members here at THE RAINBOW, Radio Shack's technician ended up replacing the entire circuit board. The changing characters seem to point to RAM problems. If you can get a RAM test program (like Radio Shack's Diagnostics cartridge), put it in and leave the computer running; if any bad bits show up, replace the appropriate chips. This may well be a permanent cure. (If you only have 16K, you might want to go ahead and install a set of 64K RAM chips if one or more of your original set is bad.)

Something Old, Something New

• *I recently purchased a disk drive system from Radio Shack; the unit I received fits the CoCo 2 and not the earlier model. I was told that Radio Shack had modified the controller so it would work on my 'E' board machine.*

I would like to know if another company makes a disk drive that will work on my computer, because the Radio Shack salesman in Chicago whom I spoke with said that the disk system for my computer is no longer being made and that there are no other systems of this type (catalog number 26-3022) in stock in Illinois or Indiana.

Edward Wolak
Chicago, IL

There should be no problem using the newer disk system with your computer. The new controller works fine on the older machines; we confirmed this here at THE RAINBOW office.

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CoCo16 ECB . . . . Tape: $16.95

SPELL BOMBER

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RECEIVED & CERTIFIED

The following products recently have been received by THE RAINBOW, examined by our magazine staff and approved for the *Rainbow Seal of Certification*, your assurance that we have seen the product and have ascertained that it is what it purports to be. This month the *Seal of Certification* has been issued to:

Educational Simulations, a package of educational games. *Image Processing* allows the user to process and enhance images; *Strategy Football* makes the user the coach, quarterback and defensive signal caller of a football team; *Strategy Politics* is a Simulation of a presidential election; *Strategy Boxing* makes the user the coach of the U.S. Olympic Boxing team; and *Strategy Investing* is a simulation of the stock market from the point of view of investors. Ankia Research, 901-19 Indiantown Road, Suite R, Jupiter, FL 33458, disk $69.95

Mathematics Program, a passel of 32K math programs. *Function Finder* finds the mathematical function that expresses a set of numbers; *Calculus* performs integration and differentiation; *Equation Evaluator* solves two forms of equations, the polynomial and/or set of linear equations; and *Matrix Math* allows calculating the determinant, the inverse, addition, subtraction and multiplication of matrices. Ankia Research, 901-19 Indiantown Road, Suite R, Jupiter, FL 33458, disk $44

Professional 3-D Plotter, a 32K ECB program that produces a three-dimensional plot of a 32 x 32 data set with hidden line removal. The program allows adjustable scaling of data, adjustable aspect ratio (the "look-angle") and cassette or disk I/O. Ankia Research, 901-19 Indiantown Road, Suite R, Jupiter, FL 33458, disk 24.95

Spectrum Analyzer, a 32K ML Fourier transform that calculates the frequency spectrum of a data set. It is designed for the user to examine the properties of a Fourier transform and operate on the data or functions inputted. Ankia Research, 901-19 Indiantown Road, Suite R, Jupiter, FL 33458, disk 24.95

BBS Log Book, helps you keep track of your phone calls and related information when accessing Bulletin Board Systems. Included are sections to record long-distance calls and a personal directory to help you logon faster, remember your password and access numbers. Atmospheres, 1207 Eighth Ave., Brooklyn, NY 11215, $5.95 plus $2 S/H

FLEX Color Connection, a FLEX utility that allows access to a multitude of multi-user computer systems like CompuServe and The Source and single user bulletin board systems, as well as connecting two Color Computers together. Computerware, Box 668, 4403 Manchester Ave., Suite 102, Encinitas, CA 92024, disk $49.95 plus $2 S/H

Color Connection, an OS-9 utility which allows access to a multitude of multi-user computer systems like CompuServe and The Source and single user bulletin board systems, as well as connecting two Color Computers together. Computerware, Box 668, 4403 Manchester Ave., Suite 102, Encinitas, CA 92024, disk $49.95 plus $2 S/H

PP Color Dump Version 2.0, a 32K ECB ML program that requires a CGP-115 printer plotter and is menu-oriented. Features include: single keystroke, commands, double-sized printouts and ability to work in all *PMODEs*. Derby City Software, 3141 Doreen Way, Louisville, KY 40220, cassette $19.95 plus $1.50 S/H

GTRM, an OS-9 Hi-Res Screen and Window terminal program that is transparent to OS-9's operation, and reformats the screen for 24 rows of 51 characters, with true upper- and lowercase characters. Effective editing of block structured languages is possible with enough characters per line so that indentation can be utilized to illustrate the structure of a program module. Dugger's Growing Systems, P.O. Box 305, Solana Beach, CA 92075, disk $34.95

SOLVE, (**S**ymbolic **O**bject/**L**ogic **V**erification and **E**xamination) an OS-9 debugging tool for testing errant software, which has monitor-like commands to work at the lowest level, full assembler and disassembler that allow symbolic operations. *SOLVE* single steps a program, executes it real-time with breakpoints or simulates it with conditional traps for solving errors. All levels of operation allow symbols as part of the expressions required for command. Dugger's Growing Systems, P.O. Box 305, Solana Beach, CA 92075, disk $99.95

Test Manager, a 32K disk-based multiple choice test maker that requires a printer and creates, edits and mixes question files of up to 150 questions and answers. These files can be printed in order or randomized. An answer key is printed in the same order that the test is printed. 80 Custom Software, 5720 Brooke Lane, Sylvania, OH 34560, disk $29.95

ElectraGuard, a solid state protector that performs a "life-guard" function by suppressing transient voltage surges which may damage sensitive equipment. Howard Medical Company, Box 2, Chicago, IL 60609, $16.25 plus $2 S/H

B-XREF, an OS-9 utility designed to create a sorted cross reference of a BASIC09 program. All variable names, data types, procedure names and label references will appear in the cross reference along with line numbers in which the variable or line number is referred. The report may be directed to any valid OS-9 device or file. Interactive Micro Systems. P.O. Box 21007, Columbus OH 43221, disk $19.95 plus $2 S/H

KEY-WIZ, an OS-9 utility which permits databases containing textual information to be stored, searched and sorted according to a profile of keywords which are specified along with logical operators. Interactive Micro Systems, P.O. Box 21007, Columbus, OH 43221, disk $24.95 plus $2 S/H

Space Frame, a 16K engineering program which uses the finite element technique that divides structures into mathematically manageable units. This technique uses a banded matrix reduction routine to analyze structures to determine stress, strain and force. Kage Engineering, P.O. Box 3010, Lakewood, CA 90711-3010, cassette $50.00

SGS, a 5.5K Semi-Graphics Support utility system that allows for easy-to-use graphics commands from a BASIC program. Circles, lines, retangles, coloring (up to eight colors), animation effects and user-created sounds are possible from ECB or Disk BASIC programs. Micro Computer Systems, 1404 Sunset Drive, Friendswood, TX 77546, cassette $24.95, disk $34.95

Talking Adventure Starter, a 16K ECB program that consists of two separate and complete Adventures. The first, called *MY-HOUSE* is a simple Adventure with no serious pitfalls. The second, called *PIRATES* is a harder Adventure, but help is available if you get stuck. Owls Nest Software, P.O. Box 579, Ooltewah, TN 37363, cassette $17.95

PERMFLAW, will mark as flawed any bad areas of a Color Disk BASIC disk. The several sectors that Disk BASIC does not use in the directory track will be ignored by *PERMFLAW* regardless of flaws. Any other error detected in the directory track will cause *PERMFLAW* to abort with a message stating that the disk cannot be used by Disk BASIC. A *PERMFLAWed* disk cannot be used as a destination disk on a backup. Joseph M. Schneid, 8703 Cotswald Dr., Louisville, KY 40258, $13.95

Pengon, a 16K Color BASIC ML adaptation of "Pengo" requiring one joystick. The object of the game is to move your penguin around the playing field and collect the magic ice cubes. Spectral Associates, 3418 South 90th St., Tacoma, WA 98409, cassette $24.95, disk $27.95

Syzygy, a 32K ECB ML arcade game requiring joysticks. You are trapped aboard the Deathstar. Darth Vader has your light saber and the means to thwart your every avenue of escape. Spectral Associates, 3418 South 90th St., Tacoma, WA 98409, cassette $24.95, disk $27.95

Crystal Castles, a 32K ECB arcade game requiring two joysticks. The objective is to control Bently the Bear's rampage through enemy castles as he gathers loot. Spectral Associates, 3418 South 90th St., Tacoma, WA 98409, cassette, $24.95, disk $27.95

Color Panic, an ML adaptation of the arcade game "Space Panic" requiring 32K and two joysticks. Your mission is to stay alive on a planet filled with zombie-like mutants who are bloodthirsty from playing too many space arcades. Spectral Associates, 3418 South 90th St., Tacoma, WA 98409, cassette $24.95, disk $27.95

QIKS, a 32K arcade game requiring joysticks. The method of play involves controlling a marker and blazing a trail as you avoid deadly sparx, qixs and fuses. Spectral Associates, 3418 South 90th St., Tacoma, WA 98409, cassette $24.95, disk $27.95

Star Spores, a 32K arcade game requiring joysticks, that pits you against invaders from the galaxy Nastira. The Nasties are only vulnerable upon awakening from cryo-sleep. Spectral Associates, 3418 South 90th St., Tacoma, WA 98409, cassette $24.95, disk $27.95

Devious, a 32K arcade game requiring two joysticks. The objective is to blast every thing in sight: the ships, the ground bases and the mother ship. Spectral Associates, 3418 South 90th St., Tacoma, WA 98409, cassette $24.95, disk $27.95

G'N'T (Graphics and Text), a 32K ECB graphics utility that gives the capability of intermixing text and graphics on a Hi-Res screen (*PMODEs 3* or *4*). Features include: modifiable character set, true lowercase, control of size of the scrolling window. Included with *G'N'T* is CHRGEN which allows change, delete and your own characters. Spectral Associates, 3418 South 90th St., Tacoma, WA 98409, cassette $9.95

CoCo Screen Dump, a 16K screen dump program for the Epson and Gemini printers. Options include: standard or reverse images, regular or double-sized pictures and 600-900 Baud. This program is helpful for *Graphicom* and *Bjork Block* users. Spectrum Projects, P.O. Box 21272, Woodhaven, NY 11421, cassette or disk $19.95 plus $3 S/H

The Animator, a 32K ECB animation program that features professional motion picture animation techniques, 12 "help" screens and a comprehensive manual. Thirty-two "cels" or character positions are cycled and recycled to create the illusion of motion and sound effects are possible. Triad Pictures Corp., P.O. Box 1299, 134 Simders Rd., Sequim, WA 98382, three cassettes $35, plus $2 S/H

Alphabet Stew, a 32K ECB education program for preschoolers which rewards recognition of letters of the alphabet and correct usage of the keyboard with pictures, shapes, colors and melodies. Triad Pictures, P.O. Box 1299, 134 Simders Rd., Sequim, WA 98382, cassette $18 plus $2 S/H

Centipede ABC's and Centipede 123's, two 16K ECB programs designed to guide preschoolers through letter and number recognition. Both programs feature Hi-Res graphics. Triad Pictures, P.O. Box 1299, 134 Simders Rd., Sequim, WA 98382, cassette $16 each, both $25 plus $2 S/H

Jungle Queen, a 32K arcade game featuring four Hi-Res screens complete with objectives, perils and tips for combating the dangers. Zoso Software, 6606 Skywae Dr., Columbus, OH 43229, cassette $26.95

The *Seal of Certification* program is open to all manufacturers of products for the TRS-80 Color Computer, the TDP-100, or the Dragon-32, regardless of whether they advertise in THE RAINBOW. By awarding a *Seal*, the magazine certifies the program *does exist*, but this *does not* constitute any guarantee of satisfaction. As soon as possible, these hardware or software items will be forwarded to THE RAINBOW's reviewers for evaluation.

— Monica Dorth

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REVIEWING REVIEWS

SHAFT

Editor:

Your review of *SHAFT* (July 1984, Page 23), did the game no justice. Mr. Schechter obviously did not give the game a fair trial before writing his review.

To begin with, Mr. Schechter stated that the graphics were not as good as many other current games. Why should they be? I received my copy of *SHAFT* in June 1983. This hardly allows for the game to be compared with today's graphics. Your reviewer obviously did not play the game very long. I have never come across a situation in which escape was impossible as Mr. Schechter stated happened to him. Also the patterns are not random, as there are about 12 different patterns which the elevators follow.

T. Sherfy
Fayetteville, NC

WHIRLYBIRD RUN

Editor:

I would like to comment about Mr. Joe O'Conner's review on *Whirlybird Run* [September 1984, Page 220]. I might only be 14 years old, but I'm a big fan of video games.

First of all, there *are* explosions in the game. They're just hard to hear. Although there are exploding sounds, Mr. O'Connor, I think you're right about the rest. Saucers and rockets could have sound to make it a better game, but with the limitations of 16K, it's still pretty good.

Lastly, there is a pause feature! Push Shift and BREAK together to pause and Shift and '@' to continue.

I think this should make *Whirlybird Run* a little bit better game.

James Foster
Modesto, CA

DISKEY

Editor:

I read the *DISKEY* review by Bruce Sterling in the February issue of RAINBOW, Page 251. Your reviewer failed to tell the readers that this program will only work on Disk BASIC 1.0. I have Disk Extended BASIC 1.1. When typing *DIR*, you get "master BAS 0 B 4," as the book says. When you type *RUN "MASTER,"* you get an error in Line 20, and that's it.

I contacted Adventure International. They said it was a defective disk and to return it. They sent me another disk which does the same thing. A week after receiving the second disk, I received a letter from Adventure International saying that this is the only version of *DISKEY* and if it doesn't work, to return it to the place of purchase. That's fine, but the store has since gone out of business, so now I'm stuck with a program which can't be used.

In closing, I would like to make a suggestion to your reviewers: list the minimum system requirements and which ROMs are required to make any of the programs that are reviewed work.

R.W. Celland
Surrey, British Columbia

LEARNING GAMES FOR CHILDREN

Editor:

In regard to the review of my programs *Learning Games For Children* by Marty Sheldon [the review appears in this issue of THE RAINBOW], her first criticism is that the age range three to eight is appropriate, but not for all three games. Certainly, all children are not at the same learning level even at the same age. If my programs provide something of interest to all members of this age group and present a future challenge to strive for, then where is the problem here? I specifically state in my documentation that the parent should help his children initially going through these educational programs. The child will eventually learn the harder points and arouse his curiosity to explore further. These programs certainly are not meant as an end in themselves. This is just the beginning!

Another criticism is that it is difficult for the child to spell a word blindly after having picked the word out of a list of three. I state in the documentation that this can be difficult and I, therefore, do not penalize the child for misspellings in his score tally. I don't consider this feature of spelling a word blindly to be a disadvantage. It is another goal to be mastered and can be with some initial adult supervision.

Ms. Sheldon claims that my square is rectangular and that my circle is a "fat ellipse." I can assure you that my square was a square and that a circle was a circle on the TV set I use with the computer. However, on two other sets the shapes were indeed as Ms. Sheldon reported. None of my associates who has reviewed the programs reported any problem like this, but a small poll during the last week has revealed that the shapes are distorted on different TV sets. In facts, on some TVs the square and circle are shorter in the vertical dimension which is exactly the opposite of the reviewer's problem. It seems that the Color Computer does a valiant attempt at keeping this distortion to a minimum.

A graphics scene in *PMODE 4* or *PMODE 1* (which I use) uses a display format of 256 horizontal by 192 vertical *(PMODE4)* or 128 horizontal by 96 vertical *(PMODE 1)*. In both cases, you have a height to width ratio of 4/3. If the Color Computer were to output a graphics scene to an absolutely square monitor screen, then the vertical elements would be 4/3 longer than the horizontal elements. A square would be a rectangle! However, your TV set has a nominal aspect ratio of 4/3. The TV will typically stretch the horizontal elements by a factor of 4/3 of the vertical elements.

Let's see now, if the Color Computer puts a horizontal element that is 3/4 of the vertical and the TV multiplies the horizontal elements by 4/3 then we should get a square element! We will *if* the TV set has perfect vertical, horizontal width and linearity adjustments. The problem is that few TV sets do, including Ms. Sheldon's. The remedy, in this case, is to ignore the problem, as it is quite minor, or to adjust the TV set. (I haven't had too many complaints from four-year-olds about the circles being five percent elliptical in nature.) I don't recommend Ms. Sheldon's approach which is not to buy this program since it "teaches incorrect shapes." I have included in the documentation a section which advises the parent/teacher to adjust the TV's color controls and the vertical height/linearity and horizontal width control if necessary.

Moving on to the criticism of error messages appearing and loss of voice synchronization, I just wish that your reviewer would state my company policy regarding bad tapes instead of glibly giving us credit for not losing voice sync more often due to the number of times the recorder is turned on and off. I have gone to considerable lenghts to design a system to overcome these problems. I have recorded synchronizing data at least every 20 seconds interspersed with the verbal audio. The program searches for this data and could result in loss of voice sync if the tape were defective. It is possible to lose voice sync if the child stops the tape or advances it and I cannot protect against this if this is the reviewer's problem.

Revision E and ealier versions of the Color Computer have a problem with sticking cassette motor relays. My CoCo sometimes does this and I guarantee you that you will lose voice sync if this is the problem.

I cannot explain the error messages displayed on the screen unless it is a defective tape. I do clearly state that there is a copy on both sides of the tape if there are any problems like the reviewer experienced. I also state that there is a free replacement policy for the first 30 days. The reviewer did not contact me before she decided to report this as an inherent "problem" with the *WORDTEST* program.

I do not get a positive feeling from reading Ms. Sheldon's review and I consider these to be very positive programs. In the review, I see no mention of how the child interacts with the program other than "the child liked the incorrect buzz response." The children that I have observed became very involved with the songs, faces and the verbal instructions. They had fun! My own three-year-old became interested in learning how to read after becoming involved in these programs which I find to be the real benefit to this type of game.

Ms. Sheldon also does not mention the fact that the child is rewarded with a graphics score and verbal atta-boy which varies depending on how well he does. The rewards are always positive no matter how poorly the child does. The reward scenes and songs are randomly selected on each run of the program thus insuring that the child will be less likely to lose interest in the lesson. No mention is made of the fact that the positions of the shapes, words and number of marbles to be counted are randomized on each run so that the child can't simply memorize positions. The BREAK key is also disabled which is another positive feature.

In summary, the reviewer dwelt on minor questionable problems and many non-problems. The reviewer may have had a defective tape (my problem) but what is more disconcerting is that the reviewer did not take into account the sloppy nature of TVs and blamed the problem on the programs. The reviewer did not point out the many positive features of these programs and the enthusiasm that children exhibit when playing them, as I have observed. Only children can evaluate these programs completely and I have tried very hard to consider the child at all times.

Donald Davis
DD Software

Editor:

The criticisms of DD Software regarding my failure to account for the sloppy nature of television reproduction are invalid. It is the programmer's responsibility to design within the medium, capitalizing on its strengths and overcoming its weaknesses. The consumer will, after all, use the program on his own TV. And if the purchaser needs to be a TV repairman to reproduce the intended results of the software, he should know that before purchasing the program, not after.

Martha Sheldon
Aurora, NY

LOUD *AND* CLEAR

Editor:

In the October issue of THE RAINBOW, Mr. Ed Ellers extensively tested and reviewed the new Mark Data Products Universal Video Driver. Although, Mr. Ellers stated it was a well-designed and well-made product, there were a couple of statements in the review we would like to clarify.

Mr. Ellers correctly states that our installation instructions tell users of 'D' and 'E' boards to leave the CPU shield cover off. He strongly recommends that you carefully replace the shield after installation to minimize RFI. We do not disagree with Mr. Ellers' statement, but wish to point out that some competitive video adapters give you no choice — the shield cover *must* be left off. With our video driver, the shield cover *can* be reinstalled, if the installation is done carefully.

Mr. Ellers also reported that the Universal Video Driver audio circuit loads down the CoCo's sound generator. We found that the problem was limited to 'F' board models and was caused by an error in our installation instructions. This error has been corrected. We must point out, however, that *some monitors* with low impedance audio circuits could load down the sound signal from *all* CoCo models. The instructions supplied with the Universal Video Driver offer suggestions to help users overcome these inadequacies and also suggest how to provide audio for video monitors that do not offer this capability.

We appreciate the time and effort Mr. Ellers devoted to prepare his thorough review and the opportunity to add these comments.

Ron Krebs
Mark Data Products

NEXT WEEK I GET O-PAK!

Computers are not too expensive,
A mere few hundred or so.
Add a ROM pack of *Pacman* or *Zaxxon*.
It won't set me back too much dough.

Soon my programs get longer and longer.
A printout is what I require.
Epsons are only six hundred.
Telewriter fulfills my desire.

Tapes are such great aggravation.
I search desperately forward and back.
If I'm lucky, I find my lost program.
If not, what I get is a crash.

Disk drives become so appealing.
My friends load their files in a flash.
They don't get endless I/O errors.
All it requires is more cash.

Once a RAINBOW was something to look at,
As it shimmered and glowed in the sky.
Once *Hot CoCo* was something that warmed you.
Magazines galore I now buy.

Computer books are piled high in corners.
Chromasette — I have every tape.
I spend all my time filling coupons.
I can't resist any bait.

Software has become an addiction.
Now the money seems really to fly.
FLEX, OS-9 and then COBOL.
I look for new programs to buy.

What began as a cheap home computer,
Has mushroomed beyond all belief.
It devours much cash, endless hours.
Soon, I'll be out on relief.

My erstwhile soulmate has left me.
My employer gave me the sack.
All I've got left is my CoCo.
But, next week I get O-Pak!

— Valerie Rhead

Concordance — An Aid To Programming Development

Are you a frustrated programmer? Do you have trouble debugging someone else's program or worse yet, your own? Did you finally convince the "real" head of the household that you needed a printer only to go crazy trying to read an *LLISTed* program? Have you ever made a brilliant modification to a magazine program only to discover that the variable you used was already used somewhere else? Well, cheer up Bunky, Mr. Bill Wasson of Echo Soft has released a new utility that should make your life considerably easier.

The program requires a minimum of 32K and Extended BASIC and is entitled *Concordance*. Say what? Yes, I confess, I had to consult Webster's on this one myself. Definition: "an alphabetical index of the principal words in a book." BASIC translation: "A nicely formatted listing, a cross-reference of all referenced line numbers and an alphabetical listing of all variables and the line numbers in which they appear." Interested? Read on and I will go into a more detailed explanation.

The actual program that does all the work is written in machine language. This program is preceded by a BASIC front end program that allows you to select from many options and actually customizes the machine language code for your individual needs. Upon loading, *Concordance* asks you if you wish to make a backup copy, which it does automatically. For a utility, especially a modifiable one, this is a real benefit and shows a great deal of professionalism on the author's part. Before I forget, included with the program is a well-written, seven-page instruction booklet which covers in detail all the various options as well as how to get the most benefit from the results of this program.

Among the many options included, are the loading of *Concordance* into the upper 32K of a 64K machine, setting the printer Baud rate, selecting the type of format, i.e., 'pretty print' or 'standard' and setting the printer margins which include top, bottom and left side as well as number of lines per page and number of characters per line. Of the two types of format the standard is most similar to *LLIST* except that the line numbers are offset to make the listing more readable. The only drawback to this is, if you wish to duplicate listings in a magazine such as RAINBOW by setting the printer width to 32, you still will not get an exact match because of the offset line numbers. The other, and more impressive, format is the 'pretty print.' 'Pretty print' places one statement per line, indents both *IF. . . THEN* and *FOR . . . NEXT* statements and adds spaces wherever necessary to make everything more readable. Also included in both formats are automatic page numbering and the ability to enter a heading to be printed at the top of each page (I use program name and date). All in all, once you use the 'pretty print' listing, going back to the normal *LLIST* is like a return to the stone age.

Although the 'pretty print' option is impressive it's only the tip of the iceberg. Next comes the line number cross reference listing. This is a list of all line numbers referenced by *GOTO* or *GOSUB* as well as all *PEEKs* and *POKEs* and their addresses. This makes unraveling "spaghetti" code much less of a nightmare, and the ability to easily isolate all *PEEKs* and *POKEs* makes debugging a pleasure. (Well, almost!)

Finally, *Concordance* produces a variable cross reference listing showing in alphabetical sequence all variables and the line numbers in which they are used. It even highlights any variables used in *PEEK* or *POKE* statements. In addition to all of this, *Concordance* does this very quickly. If you have ever used a BASIC 'pretty print' or cross reference program, you'll really appreciate *Concordance*. The only reason this program runs longer than a straight *LLIST* seems to be that it uses more paper. When the program listing finishes the cross reference listing it prints it immediately, there's no hesitation.

The next best thing to having a printer is this program. Enclosed with each program is a personal note from Mr. Wasson providing you with his home phone number should you have any trouble or questions.

(Echo Soft, 17 Skyline Dr., Chalfont, PA 18914, cassette $21.95, disk $24.95)

— Ken Boyle

Aurora Computing

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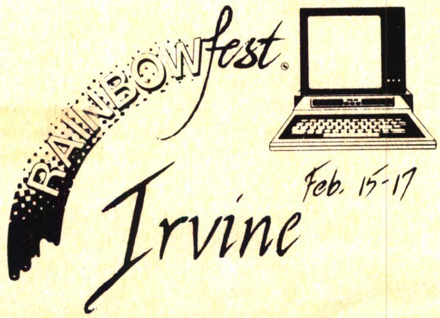

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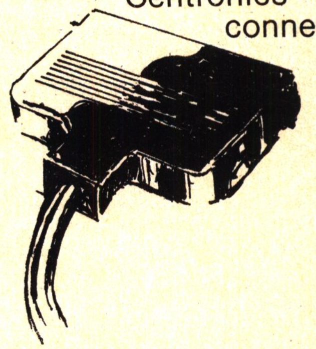

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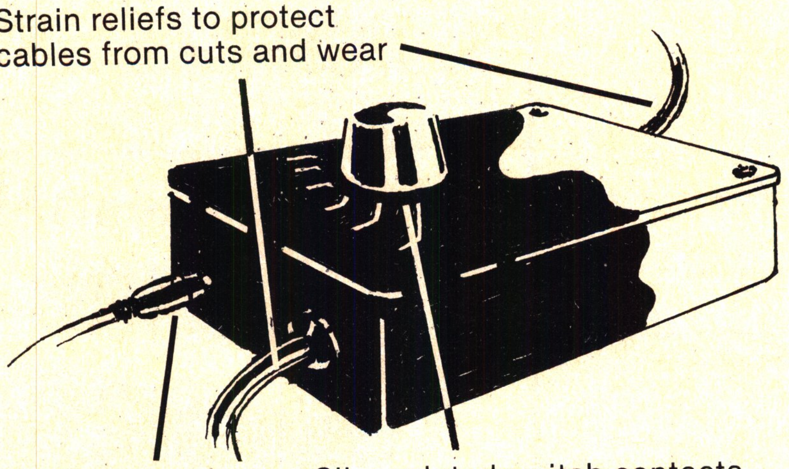

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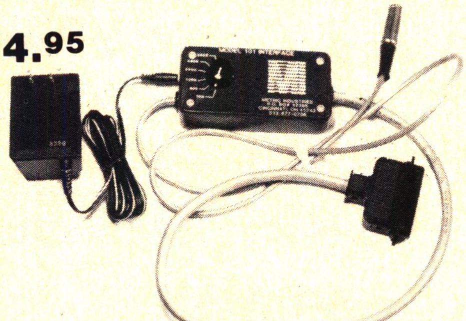

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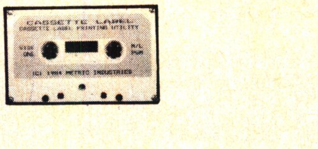

- Prints five lines of information on pin-feed cassette labels
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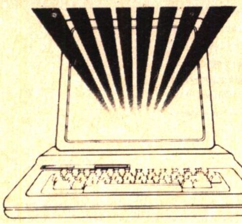

SUPER SCREEN

The Color Computer Supercharger

- A big 52 character by 24 line screen
- 'PRINT @' is fully implemented on the big screen
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- The 'ON ERROR GOTO' statement is fully implemented
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Super Screen comes with complete, well detailed instructions and is available on cassette or disc. It adjusts automatically to any 16K or greater, Extended or Disc basic Color Computer or TDP-100 and uses only 2K of memory in addition to the screen memory reserved during power up. Guaranteed to be the most frequently used program in your software library...once you use it, you won't be without it!

Hot CoCo, Jan. '84 *"Super Screen represents a quality utility program that fills a definite need for the serious CoCo user. No other programs on the market so far have offered the error-trapping utility of Super Screen."*

Color Computer Magazine, May '84 *"Super Screen is a worthy addition to anyone's software library. It has become my most used utility and has made programming in BASIC on the Color Computer a joy..."*

Cassette $29.95 **Disc $32.95**

NEW!

EASY-FILE

Data Management System

- Need a good mailing list or customer list program? How about a program to keep track of your investments, your computer magazines, or record collection? Do you have an inventory of all household items for insurance purposes? **EASY-FILE** will do all of these things and many more.
- **EASY-FILE** makes data managing a breeze with single key menu selections, extensive error handling procedures, a demonstration data file and a detailed, easy to understand instruction manual.
- **EASY-FILE** is powerful too. It automatically enhances your monitor screen to a full upper and lower case 51 character by 24 line display. **EASY-FILE** allows up to 30 data fields and provides password file protection, selectable numeric totalling, and complete data searching and editing capabilities. You can quickly enter, locate, review and modify data records, and even transfer records from one file to another.
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The Mark Data Products sales order processing system provides a fast, efficient means to enter orders, print shipping papers and invoices, prepare sales reports, and monitor receivables. The system automatically enhances the monitor screen to a 51 character by 24 line display. 32K of memory is required along with an 80-column printer and one or more disc drives.

The MDP Order Entry System is a family of programs which operate interactively by means of a "menu" selection scheme. Up to 900 products may be defined and a single disc system can hold over 600 transactions. When the operator selects a task to be performed, the computer loads a program designed to handle that task from the system disc. The system disc contains all of the programs required to create, update and maintain data files and prepare the necessary paperwork including shipping and invoice forms, daily sales reports, a monthly (or other period) sales report and a receivables report.

This order entry software equals or exceeds higher priced packages for other computers and includes a detailed operating manual. **ONLY $99.95**

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* Computers produced after approximately October 1982 require an additional keyboard plug adapter. Please add $4.95.

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Hot CoCo, June '84 *"...a serious, professional accounting program and well worth its price. The programs are complete and simple to use."*

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Up to 255 separate accounts may be defined and a single disc system can hold over 1,400 transactions. This system automatically enhances the monitor screen to a 51 character by 24 line display. 32K of memory is required along with an 80-column printer and one or more disc drives.

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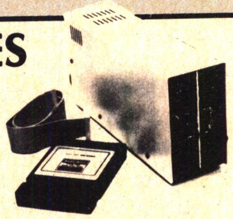

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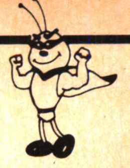

Mark Data Products **SUPER BUG** is a powerful, relocatable machine code monitor program for your CoCo. If you are a beginner, the program and documentation are an indispensable training aid, helping you to gain a better understanding of your Color Computer and machine code programming. If you are an accomplished computerist, **SUPER BUG**'s capabilities, versatility and convenience will prove invaluable during programming and debugging.

SUPER BUG offers so many outstanding features that we are unable to list them all in this limited space, but here are a few: hex and alpha numeric memory display, modify, search, and test; full printer support with baud rate and line feed select; up to 220 breakpoints; mini object code disassembler; 64K mode setup; decimal, hex and asci code conversion routines and extensive documentation.

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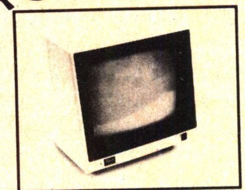

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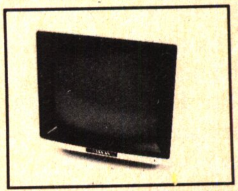

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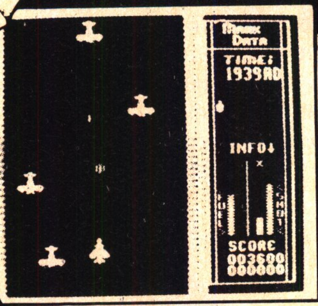

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Rainbow, March '84 *"One of the best in your library of computer games. It's a real gem."*

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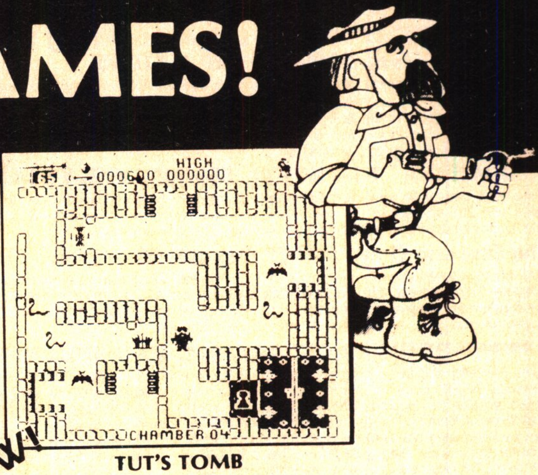

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Erland Is A Complex, Challenging Simulation Game

The year is 1250. In the gentle mists of a medieval old Ireland morning, Erin of Donegal, tenant landowner, stands on a hill overlooking his 500 acres. Gazing over his modest holdings, he wonders if the fish harvested by his one fishing boat will be enough to feed his peasants. The grain harvest was good but rats destroyed much, and prices are too high to buy as much as his people really need. More cats will help keep future grain losses down, but too many cats will result in even fewer fish for his people. Not being a warlike man, he shys away from the thought of having more armed guards, but only last week Jute invaders attacked the farm just south of him. He can't afford to lose the sheep, which did so well this past winter, let alone any of the peasants; but more men will mean more fish, more grain, more pay. He could borrow money, but bankruptcy would threaten. He has been hoping to start a trade fair (bazaar) but it looks like the extra grain and the need for armed guards will take all the surplus cash this year. His hoped-for abbey will have to wait even longer. The decisions he makes will affect the lives of his people as well as his own future.

To the south, Gale of Killakee strides out of her home. Her single-minded goal is to become powerful enough to be queen; every dollar wrung out of the misery of her peasants will go to armories and more guards. If she starves a few people by selling needed grain to start a new trade fair, what does it matter as long as she has enough to man her fishing boats and farm her fields? All she has to do is make certain the peasants don't revolt. Almost rich enough to be a lady (second-level rank), she is already planning to invade Erin's lands as soon as she reaches the third rank.

Will lenient courts and low taxes allow Donegal to gain the population and people Erin needs to get ahead in life and protect himself against the scheming Gale? Will the cruel courts of Killakee provide enough war tax for Gale to attack? Can a good man survive and become king? Only hard work, good fortune and decades of time will tell.

The people who brought you the international spy thriller *Ockywoky* have done it again. The first time my wife, our teen-age daughter and I played *Erland*, we were at the computer screen from 2 p.m. until 1 a.m. the next morning. Like Monopoly, a lot of time can be spent building one's domain—or losing it. This absorbing, challenging, frustrating game of land and resource management, with its high number of interdependent variables, has to be one of the most complex Simulations ever done. Trying to keep all the factors in your head (or on paper) can drive you up the wall: buying cats (apparently all neutered) to eat the rats to save the grain which feed the people to increase the population to man more boats and farm more land to raise the sheep to feed the guards who eat the sheep...whew! And that's only part of it!

Two to five people can play this hybrid of Extended BASIC and machine language, which is well-organized and plays smoothly. Graphics are quite good, and the sound from an unexpected disaster can scare the bejabbers out of you. The updated status of the current player is available often, and a summary comparison of players is displayed at the end of each "year." A game in progress can be saved after the last player has taken his/her turn. Tape and disk versions are incompatible.

A minor grammatical error exists. When one is purchasing grain, the program asks, "How many grain do you wish to buy?" Then again, maybe it's old Elizabethan Irish.

If you've never tried a Simulation game, and you want something easy to learn but not easy to win, this is the one to start with! If you are already a Simulation fan, you'll find this a challenge. In any event, you'll love it; you'll hate it; and I think you'll be glad you bought it—though your spouse may be less than enthusiastic if you disappear for hours without letting him/her play, too!

Now if I can figure out what happened to all those lambs I bought last spring.

(Prickly-Pear Software, 8532 E. 24th St., Tucson, AZ 85710, tape $24.95, 32K ECB, disk $29.95)

— Warren S. Napier

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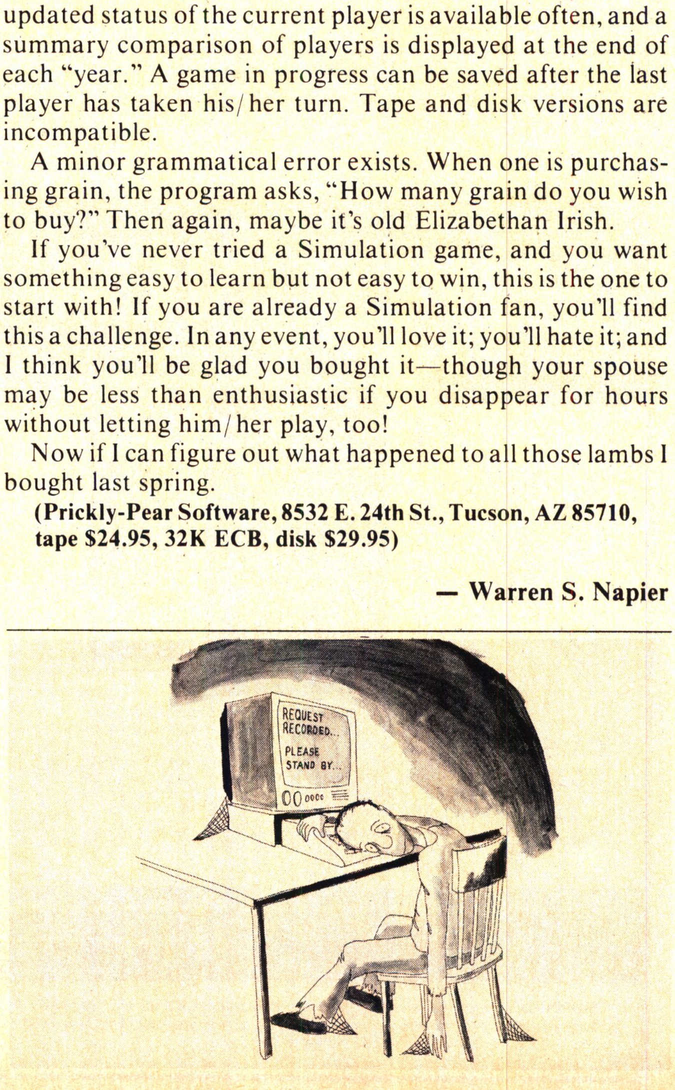
REQUEST RECORDED...
PLEASE STAND BY...

CoCo Keeps Roll And Grade Books With *Teacher's Pet*

While part of all professions, paper work and record keeping seem to be particulary evident in the teaching profession. Most secondary teachers instruct over 120 students per day and have to maintain a file of attendance, quizzes, tests, and class averages for each pupil daily. The repetitive filing system is well suited for computer operation. *Teacher's Pet* has taken the school teacher's roll book and converted it to use on the computer.

The author, P.T.Jones, includes a four-page reference manual and an eight-page tutorial. Both are well written and concise.

As with any program that develops a filing system, the majority of the user friendly program is devoted to the construction of the file. Once that is completed, continued usage throughout the school year would be quite simple.

The main menu includes the following options:

CREATE, ALPHA ORDER, EDIT/ENTER, NEW STUDENTS, SEARCH, DELETE, YEAR END REPORT, PRINT CLASS LIST, INPUT/OUTPUT, MARKS, LDIR (PRINT DIRECTORY).

Each formatted menu-screen has subsections that are self-explanatory.

Teacher's Pet allows you to enter up to 40 students per class for each of four school terms. Each student can have a maximum of nine tests per term. The *CREATE* screen has you define the parameters of your file and controls the class code, the term you are in and how many tests you want to enter. The screen is formatted with each student's name and the number of tests entered for that term. The program permits editing of names only, names and marks, or marks only with suboptions for term or test. The author developed an interesting editing system that includes hitting the BREAK key to get back to the main menu. It is not difficult to get used to and does the usual things you would expect an editing system to do, i.e., scanning or searching the file forwards or backwards. The program also will automatically alphabetize the class lists. Fail safe systems are incorporated to prevent loss of data.

The *YEAR END REPORT* allows any or all of the terms to be given a weighting factor so that if you want the second term to count twice as much as the other terms, enter the number two. The average of each student is calculated with the list of grades entered and can be sent to the screen or printer. The average is rounded off to the nearest whole percent. A zero entered as a test mark is not averaged with numerical grades. Letter grades will be printed as zeroes and are not averaged.

The program incorporates allowances for different Baud rates for printers and explains how to enter them. The author also includes hexadecimal numbers for the machine language program and several *POKEs* to change the screen color.

If you, as a teacher, have easy access to a computer and are not required to constantly refer to your roll book for student grades, then *Teacher's Pet* would suit you. I would have liked a couple of additional features, such as a flag for students whose average was below a defined standard and a specific progress card printout for those students. Overall, *Teacher's Pet* is a nicely developed filing program.

(Aurora Computing, 49 Brookland Ave., Aurora, Ontario, Canada L4G 2H6, 32K disk, $34.95)

— Michael F. Garozzo

One-Liner Contest Winner . . .

Type and *RUN* this math program and the CoCo will ask for two numbers. Then it will add, subtract, multiply, or divide them for you.

The listing:

```
0 CLS:INPUT"TYPE 2 #'S";X,Y:PLAY
"L99ABBABL5D":INPUT"PICK 1)+ 2)-
 3)* 4)/";E$:PRINT:IFE$="1"THENP
RINT"ANS.=";X+Y ELSEIFE$="2"THEN
PRINT"ANS.=";X-Y ELSEIFE$="3"THE
NPRINT"ANS.=";X*Y ELSEIFE$="4"TH
ENPRINT"ANS.=";X/Y
```

Michael J. Garozzo
Morrisville, PA

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book Of Adventure* and its companion *Rainbow Adventure Tape.*)

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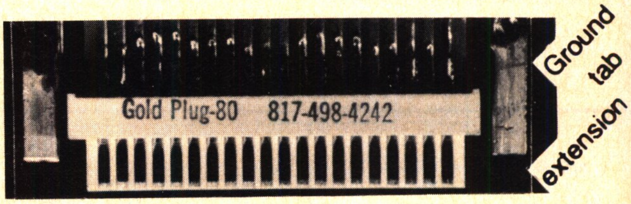

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Hands On Is 'Outstanding' Educational Software

By Mark Williams

You're a primary-grade teacher. A few weeks ago, the principal appeared at your doorway carrying a box and wearing a cheerful smile. "Your computer's here!" You approach with some trepidation; after all, no one told you you were getting a computer. Besides, computers are great iron boxes that sit alone in air-conditioned rooms and foul up people's utility bills and send out department store bills for $00, right?

Well, all of that is in the past, and you have made your peace with the computer. Now, how best to introduce your students to the computer? And can the computer really help your primary students learn concepts and skills? Those skills and concepts are important — things like colors and shapes, the concepts of bigger and smaller, faster and slower, sharing, following directions, and working independently to name a few. Can the computer do the job?

The answer is a strong, but qualified, yes. The qualification is that the success of the computer in a classroom situation depends not just on the teacher's willingness to use the computer, but on the quality of the software. Several publishers have dedicated themselves to providing high quality educational software for school and home use on the Color Computer, and now Radio Shack has signed agreements with Walt Disney Productions and with Children's Television Workshop (creators of "Sesame Street," "Electric Company," and "Zoom") to market packages of educational programs.

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This review concerns itself with one of the first of these packages, *Hands On,* by Children's Computer Workshop, an offshoot of Children's Television Workshop. It is billed as "a beginning computer experience," and is aimed at primary school-aged children. *Hands On* consists of two separate programs. The first is an art program called *Color It,* and the second is a simple word-processing program called *Blackboard.* Both programs come on disks, and require 32K Extended BASIC. Each of the programs also provides a blank disk for storing student work. In addition, both programs include a number of reproducible black-line masters of student worksheets, several laminated activity cards, and a game. The worksheets, cards, and game all tie in with the concepts dealt with in the programs. They come in colorful folders, packed in a sturdy box.

Color It is a computer literacy activity that allows the student to design and draw their own pictures. Besides being an outlet for artistic urges, this program familiarizes the student with the keyboard, as well as colors and geometric shapes. There are three levels plus a *Learning Manager* program for the teacher to use in setting up class lists and assigning a student to a particular level. Level one is the simplest, requiring little teacher supervision. (Since nearly all the directions appear on-screen as pictures, little reading ability is needed.) For students to use levels two or three, the teacher must have entered their name and a clearance for that level in the *Learning Manager* program, which controls access to those levels. The two higher levels add the ability to change color sets, shuffle colors within a picture, do horizontal or vertical flips, move, shrink, or enlarge a picture. These options were instant hits with students. At level two, the student can save a picture on his own disk. At level three, the student can allow others to access his drawings or not, as he chooses. Error trapping is comprehensive, both in the student and teacher areas of the program.

Twenty reproducible masters and laminated activity cards contain classroom activities that directly relate to one or more skills/concepts dealt with in *Color It.* A game combines the use of a grid and color and shape recognition to reproduce a pattern.

The word-processing program, *Blackboard,* is also divided into three levels and a *Learning Manager* that work in much the same way as *Color It,* except that students are working with words rather than colors and shapes. Letters can be inserted, deleted and changed, and at levels two and three, up to six screens can be saved on the student's own disk. This allows for longer stories, or for several items of information to be stored for later retrieval. Simple database management comes to second grade! At level three, screens can be titled, or addressed to another person, and can be accessed by others at the student's option. Thus, a simple electronic mail network is possible. Students working with this program should have no trouble grasping the usefulness of *E-Mail* or *WordStar.*

Although *Blackboard* could be used with first-graders, it will probably be of more use in a second, third or fourth grade classroom. Again, there are a number of classroom activities that tie in with the skills and concepts dealt with in the program. In particular, this program could be a powerful stimulus for a student who is reluctant to write with pencil and paper.

Both programs were popular with students, eliciting favorable comments all around; but *Color It* received the most repeated use. I suspect that the program's appeal would not be limited to the lower grades, either. At least one student wanted to know if his teacher would let him turn in his spelling words on a disk to be read by the *Blackboard* program!

I've saved the best until last. Upon opening the box, the user discovers a well-written, 23-page teacher's manual. This manual covers everything, from detailed instructions on how to set up, connect, and power up the computer, to goals and objectives of the programs (both affective and cognitive), to detailed lesson plans for the various worksheets and activity cards. This is the best documented educational package I've seen for the Color Computer. The directions are so complete that you could give the teacher's manual to a first-time user, take away the manuals that come with the Color Computer, and still run a very good chance that the novice would have the program up and running in short order without outside help.

The one flaw is, unfortunately, a serious one. No backup of any kind is provided. Especially when working with young children, this is an invitation to disaster. A call to Radio Shack's regional education office revealed that there is a way to get a backup copy. The damaged disk must be returned to the Radio Shack Computer Center the program was purchased from. That store will order a replacement copy of the disk from Fort Worth, Texas. When the replacement copy arrives, the purchaser will be notified. Although there is no charge for this replacement, the process could easily take weeks. Meanwhile, you are left without the central part of a very fine package of materials that may well be the basis of several weeks' learning in class. While this may be acceptable in a home environment, it is completely unacceptable in a school setting. Since the disk is encrypted, why not provide a second encrypted copy so the program can continue in use while the damaged copy is replaced? Or, why not include a utility that would make a limited number of copies (say, three), such as Random House does on their disk versions of programs for the Model III? The lack of an immediately accessible backup, or the ability to make one, is a major concern to educational purchasers.

With this exception, *Hands On* is an outstanding set of programs, well worth consideration for use at school and at home.

(Radio Shack Stores nationwide, Cat. No. 26-2539, $99)

Hint . . .

One thing that Color BASIC owners lack is an exponential function (xy) comparable to x[y or x↑y. The lengthy subroutine in the *Color Basic Manual* will do the job, but for simple positive exponents you can use this single line:

```
K=1:FOR T=1 TO Y:K K*X:NEXT T
```

Try it for various values of x and y. It works.

T. Gray
Sunnybrook, Alberta

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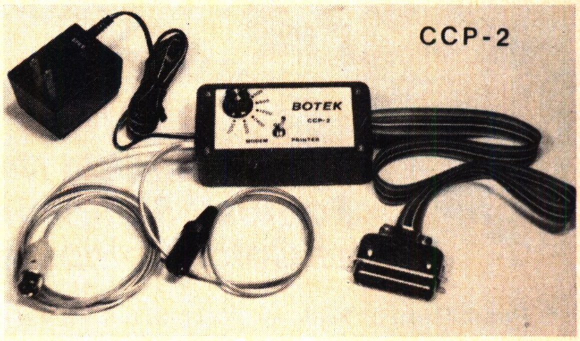

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Software Review

Let *Color Finance II* Manage Your Checking Account

By Frank J. Esser

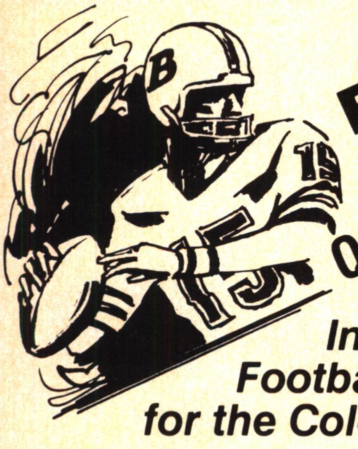
The November '83 issue of THE RAINBOW carried a review I wrote about the *Color Finance* program. Since that time the author has made some enhancements and incorporated the *MSI Color Calendar* program. This review is about those updates and the *Color Calendar* program. For the necessary information I would suggest that you read the review in the November '83 RAINBOW. The previous program is as described in that review. The updates are to enhance the program and add to what was already in place. What has been added? *Color Finance II* will now print checks for you, and will give you check reconciliation on multiple checking accounts. Also included with *Color Finance II* is the *MSI Color Calendar* program.

Color Finance II comes on a single 5 ¼-inch diskette and is not write-protected. The manual is spiral bound and well designed. *Color Finance II* also requires 32K, with at least a single disk drive and a line printer. As in *Color Finance*, a cassette recorder can be used to backup data records. This is an item I like to see, especially in the area of financial and business programs. The ability to store data on magnetic tape for archival and data backup is excellent. *Color Finance II* also uses a personality plug which is inserted into the left joystick port. If the personality plug is not in the left joystick port, *Color Finance II* will not run. It is a method to help safeguard your financial files from unwanted tampering.

The manual is of the same high quality as *Color Finance*. The new commands added to *Color Finance II* are; CALENDAR SCHEDULE, RECONCILIATION MODULE, and PAYEE FILE MAINTENANCE. The CALENDAR SCHEDULE command will get you from *Color Finance II* to *MSI Color Calendar* program. Since this program is not an integral part of *Color Finance II*, I will do its review after the updates to *Color Finance II* have been covered. Entering the 'R' will get you into the RECONCILIATION MODULE. This section is used to balance your checkbook. Actually the whole process is quite simple. Upon entering this section, you will be asked for the month/year through which you desire to balance the account. You are then asked which account you wish to balance. After these items have been entered, the checks that have not cleared the bank will appear on the screen. If an item displayed has cleared the bank, enter a 'P' after it, which stands for Posted. After all items have been marked, *Color Finance II* will display your check register balance and bank statement balance. If you have not made an error, the two should be equal. *Color Finance II* will now hold all outstanding items for your next bank statement. The addition is logical and very useful.

You can now tell at a glance which checks have or have not cleared the bank. The check WRITING MODULE is another very powerful and useful addition to this fine program. It is set up to print checks on Radio Shack's Check (form #72-124). I did not dig into the program, but since it is written in BASIC, except for the screen formatter and handler, if you prefer to use someone else's checks, surely it could be done. When you are posting checks to the check register, a check number is listed when the check is posted. If you want to enable the auto-check writing feature for this entry, then in place of a check number, you will enter 'A' followed by a two digit number. The 'A' instructs *Color Finance II* to use the automatic check writing feature on this check, the two digit number tells *Color Finance II* to whom the check should be made payable. Thus, you may have up to 99 different payees on file at any one time. I brought the feature up and ran a couple of dummy runs on my printer using just blank paper instead of the usual checks and it works beautifully. The auto-check writing feature is enabled after all the checks are entered for a given session. You have the ability to mix checks which will use the auto feature and regular checks that you have hand-written in the same session. Also, this feature will apply to all bank accounts you have in use. It is very easy to learn and very easy to use, as is all of *Color Finance II*. The addition of the ability to auto-write checks required the addition of a complete module to *Color Finance II*. This module provides the necessary maintenance functions for the payee file. That module or section is called PAYEE FILE MAINTENANCE. Upon entering an 'F', the following menu is presented:

I = Initialize Payee File
L = List Payee Names
R = Retrieve Payee By Code
A = Add or Change Name/Address
P = Print Payee File
E = End Payee Maint/Return To Menu
Enter Selection



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Let's look at each of these commands. The initialize payee file command does just that. It creates a payee file and if it already exists, it will clear it of all data. You have the ability to store 99 individual names and addresses.

The list payee names will list the first name of each payee stored on the file. Each entry is coded with a sequence number and all empty entries are shown as "PAYEE NO XX AVAILABLE."

The retrieve payee by code will view the four line name and address of a given payee when referenced by sequence number.

The add or change name/address module is used to maintain the payee file. Upon entry the file is displayed in column form. The sequence number along with the payee name is displayed. At the end you are asked if you want to change an entry, page to the next screen of payees, or return to the main menu. Selection of the page option will get a second screen full of payee entries. Selecting the change option will allow the user to either change an existing entry or add a new one. The process is repeated until the return main menu option is selected.

The print payee file option will do just that. Using this command will allow you to either print a complete reference list or a set of mailing labels, whichever you desire.

The end payee maint/return to menu will return you to *Color Finance II*'s main menu.

The *Color Calendar* is now included as a part of the *Color Finance II* package so it will become a part of this review update. The *Color Calendar* program comes on the same disk as the *Color Finance II* programs, but will have to be transferred to another disk to run. There just is not enough room to hold the monthly calendar files and the monthly data files created by *Color Finance II*. The steps necessary to move the required programs are amply described in the instruction manual. Once on its own disk, it is ready to run. *Color Calendar* is brought up by typing *RUN "CALENDAR"*. Once loaded you are presented with the following screen.

Calendar Menu

(I) = Initialize Calendar
(C) = Display Calendar
(D) = Display Daily Entries
(A) = Add Daily Entries
(K) = Delete Daily Entries
(E) = End Calendar Program
Enter Selection

Selecting 'I' clears the calendar file. A second menu appears that asks you a second time if you want to clear the file. This gives you a normal exit if you change your mind, and will leave the file intact.

Selecting 'C' brings up a second menu asking for the month and year that you want displayed. Once these questions are answered, the desired month of the desired year is displayed on the screen. The calendar entries are correct in respect to the day of the week. Also, the number of entries in the calendar file for each day in the displayed month will be indicated on the display. You are given the option of making a hard copy if so desired.

Selecting 'D' bring up the following menu:

Display Entries Menu

(A) = List All Entries

TDP

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```
(M)  = Select Month
(F)  = List From-To Date
       Enter Selection
```

'A' will get a screen list of all the entries in the calendar file. 'M' will get a list of all the entries in the file for a given month. 'F' will get a list of all entries in the file that fall between two given dates. The start and end dates are entered through a prompt.

Selecting 'A' will get the following menu to appear.

```
MM DD TIME————————ENTRY————————-
.. .. .... ........................
```

From this menu entries are made into the calendar file. As you can see you are restricted to no more than 25 characters for the entry information.

Selecting 'K' will get the same header as described in 'A', except a sequence number has been added. It is through this sequence number that the records to be deleted are referenced. This section allows you to delete records from the file. Selecting 'E' will end this session and return control to the BASIC interpreter.

I liked *Color Finance* when I reviewed that package last year. The additions that have been made are useful and enhance an already good package. The ability to reconcile your checking account through *Color Finance II* is a plus. How many times have you sat there writing out checks by hand, wondering if there is a better way. Well, with *Color Finance II*, there is. Of course, you must order preprinted checks and have a printer on your system to make it work. But if you desire to have *Color Finance II* help you manage your personal finances or help you in a small business operation, then the entry of the data in to *Color Finance II* is all that is required. By properly annotating the entry, the checks are automatically printed when the posting for that session is completed. The addition of the *Color Calendar* to the package is a real bonus. It gives you the ability to mark and remember important dates and events. It takes only a couple of minutes to see just what is on one day's entry. You can scan a month of entries or any date interval that you specify. *Color Calendar* provides all the necessary functions to properly maintain the calendar data file. The programs and documentation for *Color Calendar* are in the same fine tradition as the rest of the MSI Color programs. I find them to be of very good design in that they have no apparent pitfalls and do provide good error trapping where possible. They are well done and the documentation is clear and easy to follow. For home financial and small business applications *Color Finance II* and the CoCo are a good team.

(Delker Electronics Inc., P.O. Box 897 Dept D, Smyrna, TN 37167, disk $69.95)

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Kingdom Of Bashan — For The High-Spirited Adventurer

At first glance, it looks like another easy Adventure for Thorafin Crimsonblade, Adventurer extraordinaire, as he silently slips the cassette tape containing *Kingdom of Bashan* by Owls Nest Software into the cassette player. As he enters the temple Adventure by slyly typing *CLOADM*, he sees a lovely title page that reminds him of his exploits in the Far East. But of course, that is another story. As he begins the Adventure in earnest, he finds that this could be his toughest challenge.

Indeed, Thorafin feigned death more than a few times during his visit to the *Kingdom of Bashan*, but telling the story in full would ruin the exploits of other true Adventurers who choose to plunder at home on their own computers, so I will include the outline of the Adventure program, and not that of Thorafin's travels.

This Adventure program is a top notch, high quality program that is geared to the advanced Adventurer. The program took me over 50 hours of playing time to solve, and it required all the help messages and clues I could squeeze out of the program before I could finally score the necessary 200 points.

The Adventure itself is set in an Arabian-like setting which is unsuited for the faint-hearted. Getting to the temple, finding the 10 items and managing to leave alive can be difficult at best, but after this is accomplished, the Adventurer really feels like he has done something worthwhile. The program is well written, and includes a help command and several commands to list available verbs, objects and rooms. Also included are facilities to save the Adventure in progress and (a nice touch) to backup the program itself. *Kingdom of Bashan* is probably the most complete and thoroughly written one I have seen. As a result, it takes over 29K of program and variable storage, and will not load with the disk ROM pack enabled on a 32K machine. Although the help and verb listing commands are included, do not expect to be walked through this one. It is meant to be challenging and lives up to its purpose every step of the way. Also, the writers have done something that makes it certain that you will not cheat your way through the Adventure because the program cannot be listed, so you can't try to figure out the program logic that way.

Overall, I would recommend the *Kingdom of Bashan* to anyone who really wants to be thoroughly tested by a well-written Adventure. First-time Adventurers, however, should stay away until they have solved a few other Adventures. I found that $17.95 is a small contribution for the amount of Adventuring it gives.

(Owls Nest Software, P.O. Box 579, Ooltewah, TN 37363, 32K ECB cassette $17.95 postpaid.)

— Eric Oberle

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Master Your Files With *Masterfile*

Sooner or later after you have had your computer for a while, those inevitable words will be heard: "I know that program is on one of these things somewhere." What you probably need is some sort of program to catalog your files. *Masterfile* is one such program used to catalog diskettes.

My review package came with two diskettes, both identical, and a seven-page instruction manual. *Masterfile* requires a 32K Extended Color BASIC machine and at least one disk drive. It will also work with two drives and provides full user prompts for switching diskettes with either one or two drives. The program is completely menu-driven and very simple to use.

The manual begins with a discussion of file organization and the necessary steps to get started. *Masterfile* places your files into user-created categories called "modules." A module may contain games, utilities, etc., or anything you like. The module name may be up to 12 characters long, but only the first eight are used to determine uniqueness. Each module may be up to 500 files long and you may have over 15 full modules, giving a total capacity of over 7,500 files. *Masterfile* inventories each diskette as a separate volume and you may assign a three-character alphanumeric volume name to each. Using *Masterfile*'s optional volume write feature, you can write your volume designation on an unused portion of each diskette's directory. However, you must remove any write-protect tabs to utilize this feature.

The master diskette contains two versions of the *Masterfile* program. One of these uses high speed pokes and the other does not. The manual provides a small test program to see if you may use the high speed version since some computers have problems operating in this mode. From here you are instructed to make a backup copy of your master diskette and retain only the version of *Masterfile* you wish to use, putting your original diskette away for safe keeping.

Running *MFILE* begins execution of the program. If you have not created any modules yet, you are greeted by the main menu; otherwise, you receive a listing of existing modules, each preceded by a number. Entering the desired modules number will load that module and then bring up the main menu.

The main menu consists of 11 options as follows:

1) Module operations — brings up sub-menu to list modules, print a directory of modules, load a module, kill a module, rename a module, or return to main menu.

2) Update directory (catalog of files) — you may add a new diskette to your directory, modify the contents of a diskette already in the directory, or return to the main menu.

3) Create directory (module) — allows you to create a new module.

4) List directory to screen — you may list every file in a module, every file on a particular volume (disk), or return to main menu.

5) Print directory — provides a dated paper copy of your directory within a module.

6) Sort files — sorts, in ascending order, all files within a module.

7) Find file — find one file or all files beginning with a specific string or having a specific extension. Uses a slash, period, or space as a delimiter.

8) Execute program — allows single-key loading and executing of a program. Some programs may not load due to the size of *Masterfile*.

9) Disk directory — invoke the standard *DIR* command.

10) Verify volume — reads the volume number *Masterfile* placed on a diskette, provided you used the write volume option.

11) Return to BASIC — terminate execution of *Masterfile*.

Masterfile is well-documented and easy to use. The usage of the word "directory" becomes confusing at times since it refers to both your catalog of files and an actual disk directory. One thing to be aware of is that only an entire diskette may be allocated to a single module. This means that placing programs that belong in different modules on the same diskette should not be done. Also, *Masterfile* has a menu option to kill a module but not a single volume. The only way I have found to do this is to place a blank formatted diskette into your drive, and using the "update directory" modify option, give *Masterfile* the volume number you wish to remove. The modify option will remove this volume and then rebuild it, but with no files. This seems to make the volume disappear from the directory of disks. A kill volume option would be a definite plus. Another possible enhancement would be to utilize the "write volume" option as a safety feature to prevent you from updating the wrong volume number in your directory. That is, you can specify an update on volume 01A but place 02A into your drive. Volume 01A will be removed and rebuilt, but will contain the files from volume 02A instead of the correct ones. To be safe, you must use the "verify volume" option before using the "update directory" option.

(Sofge Enterprises, P.O. Box 309, Hilliard, FL 32046, $19.95, 32K disk)

— Larry Birkenfeld

One-Liner Contest Winner . . .

This program is fairly simple, but it produces some rather interesting results. So type it in, let it run through a couple of times and you'll see how good graphics on the CoCo can be. Be sure to run it on a color TV or color monitor.

The listing:

```
1 PMODE4:PCLS1:SCREEN1,1:FORI=1T
O6:N(I)=RND(256)-1:NEXTI:FORY=-1
TO190STEP6:FORI=1TO6:POKE178,N(I
):LINE(0,Y+I)-(255,Y+I),PSET:NEX
TI:NEXTY:RUN
```

John Sciarabba
Rochester, NY

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book Of Adventure* and its companion *Rainbow Adventure Tape.*)

Pilgrim's Progress: A Good, Religious Adventure

Pilgrim's Progress is an Adventure in learning and is oriented towards the Christian CoCo user. Many of the decisions made by the player must be tempered by common Christian teaching and behavior, and you may find yourself less successful in scoring in the Adventure if you are not schooled in the Bible.

The user must discover the commands which will work in the Adventure. Most are easy to discover and figure out in the appropriate situations, but some discoveries would be aided by Christian training. There are 30 commands possible so you are not limited in your choice. And more than one command word may accomplish the same thing. The object of the game is to obtain all nine fruits of the spirit by exploring the 26 locations and acting or exploring in a Christian way. The nine fruits which you seek are: love, joy, peace, long-suffering, gentleness, goodness, faith, meekness and temperance. For example, to get one of the fruits of the spirit, such as meekness, you must be meek at some point in the Adventure. The command *SCORE* will list the fruits you have obtained. Any objects found and retrieved, can be seen by the *INV* command, which stands for inventory. An interesting 'Help' is the reference to scripture which gives clues to some situations. Saving an Adventure is also possible and that is always a welcome feature in any Adventure.

The program is an adaptation of the John Bunyan masterpiece *Pilgrim's Progress* as stated in the documentation. I did not have a copy of that material but perhaps a copy would aid a player in solving the Adventure. Of course, one could also *LIST* the program to aid his progress. As for the difficulty level, I feel it is not an easy Adventure and will take some persistent effort by even the most religious player. There are a couple of seemingly endless mazes which I find useless since they lack challenge and usually require you to BREAK and *RUN* the program over. Not mentioned in the documentation is that hints and a solution map can be acquired by sending a SASE to the company. This is a good feature since some people may want to use the program in a church study class and it is always nice if the instructor has all the answers, especially in an Adventure.

So although this may not be a program for the pure Adventure enthusiast, I feel confident that those with strong Christian orientation will find it a delightful and edifying Adventure.

(Quality Christian Software, P.O. Box 1899, Duncan, OK 73534, 16K ECB tape $17.99)

— Douglas Pirro

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Personal Bookkeeping 84 Keeps Track Of Your Accounts

By Michael Hunt

This is one of the more difficult reviews I have written for THE RAINBOW. I can't decide whether I like this program or not. *Personal Bookkeeping 84* has some really interesting features I have not seen in similar programs that cost much more. Most of the program is user friendly and practically foolproof. On the other hand, there are some things about this program that I find very displeasing and feel would prove to be very cumbersome for most users, especially if the user doesn't want to get involved in making minor changes in the program.

Personal Bookkeeping 84 will allow you to keep track of up to 25 accounts, such as your checking accounts, savings accounts, CD's, bonds, stocks, etc. Each account is set up on disk in what the author calls a dataset. Each dataset can keep a record of the type account, location (such as bank name), balance, interest, and maturity dates. The program is designed to allow you to set up one or more of the datasets as checking accounts. One thing you may not like about the program is that if you have more than one checking account you are trying to keep track of, only the first one (if it's in the first dataset) will automatically be reconciled to your bank statement. I did not like the fact that there are 26 expense categories preset to use. Unlike other programs of this nature, they are not easily changed if you want different categories than the author uses. They can be changed but you must rewrite a line of the program in order to do so. Of the 26 expense categories the author provided, only one can be defined by the user without modifying the program.

There are some excellent features the author included. Data entry is rather easy. You are prompted for the information needed and sound is used quite effectively to let you know what CoCo thinks of the information you are entering. For example, a very low tone indicates a warning, error, rejected input, or the correction mode. Medium tones are used to prompt you for data entry, and high brief tones are used to indicate automatic internal activities. With this feature you don't need to watch the screen as you input data because if you enter the wrong information, CoCo will let you know. Entry of data is also facilitated by what the author describes as "intelligent" data entry. For instance, if you are entering the date for a particular transaction and it falls on the fourth, just enter four since there are no months with 40 days. Also extensive error checks stop entry of extreme values and require you to confirm suspiciously large values.

RAINBOWfest
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You are allowed to make seven different types of data entries in this program (DEPOSIT, WITHDRAWL, CHECK, INTEREST, EXPENSE, $ RECEIVED, AND SPLIT CHECK). I think most of these are self-explanatory but EXPENSE is used for cash expenditures and SPLIT CHECK is used to record a check without assigning it to a particular expense category. This is handy if you write a check that pays for more than one expense category, such as credit card payments. Another feature I really like takes care of EXTRAORDINARY EXPENSES. This will allow the printed reports to provide you with a more realistic picture of your monthly and yearly expenditures. These extraordinary expenditures will not appear on monthly reports, and on the yearly report they are totaled separately. For each record entered, you may include an 11-character note. This note can be useful later if you need to search for particular entries.

One thing I found irritating about data entry was when entering check numbers you are only allowed three digits. The program will only allow check number entries between 100 and 999. I found I could not get used to this and many times tried to enter a four-digit number. Well, as soon as the third digit is entered it is automatically accepted, so you either have to make a correction or if you didn't realize your mistake, check number 1873 is actually entered as 187. The reason the author did this was to allow maximum entries in limited memory, but I personally find it objectionable.

Another item you cannot enter is any service charges that you may have on your accounts. The program is set up assuming you are going to make entries on a daily basis. Therefore, when you select the enter data mode from the menu you are asked for the date. Respond with an input between one and 31. Then enter all the transactions you have for that day. If you are like me and normally enter several days transactions on a weekly basis, you have to return to the main menu and select the data entry mode for each new day.

Once you have data entered into the computer, it is fairly easy to retrieve. You are allowed to search by expense category, type of transaction (deposit, check, or withdrawal), or by the 11-character note you entered. You can also view the information sequentially in either a forward or reverse direction.

There are several different printed reports you can generate with this program. They are: ACCOUNT STATEMENT, LIST RECENT ACCOUNT TRANSACTIONS, LIST EXPENSE ENTRIES, MONTHLY EXPENSE TOTAL, and YEARLY TOTALS. The ACCOUNT STATEMENT will prepare a complete printed statement of all accounts, which contains all information about each account. LIST RECENT ACCOUNT TRANSACTIONS will provide a report of all recent transactions such as checks written, deposits and withdrawals made for a specific account. The transactions are listed to-date, from the beginning of the last month. LIST EXPENSE ENTRIES will provide you a printout of all entries for a specific expense category. You can have this information printed for the whole year-to-date or from a certain month to the current date. MONTHLY EXPENSE TOTAL will provide a printout of the last four or eight month's expenses. If you ask for the report for the last eight months then you actually will get a report that is printed in two-month intervals. The last column of this report compares expenses of the current interval with expenses of current months. I'm not sure how this feature is supposed to work. I didn't have time to enter data for four months and the documentation is not very clear if the current month is being compared to the average of the preceding months or not.

After making the request for the report the computer will prepare a color graph of the expenses to display on the screen before beginning the printout. The expenses for this screen display are lumped together so they can all be on one screen page. For example, rent, electric, household, and fire insurance are lumped together under "Home" for one category on the graph. Finally, YEARLY TOTALS will provide a report for the entire year. This report can provide an itemized printout of up to nine expense categories if you want. It will also print out the EXTRAORDINARY EXPENSES you had during the year. After this information the main report is printed. It includes five columns of information about each expense category. The first column is for untaxed expenses. The second column is for taxed expenses. The third column is a total of the first two. The fourth column adds the extraordinary expenses to the total of the third column. And the last column prints the percentage of the individual expense to total expenses.

There are three more features to this program I really like and would like to see more software authors include these as standard routines in any program requiring extensive data entry. The first two require two drives to use. Since I only have one drive I wasn't able to test them out. First, there is a BACKUP command you can use to backup your data on another disk. You would use this command the first time you started using the program. I believe the author used disk BASIC's standard backup here but he added a feature. In this mode and the next the computer will check for insertion of the disks in the proper drives. If they are reversed you will be advised to switch disks. This is an excellent feature.

The second feature is "DUPE NEW ENTRIES." This works similar to backup only you would use it after your initial setup of the main and backup disk. It will only duplicate the new entries you have made to the program. You may wonder why there are two similar routines. The reason is that disk basic's backup command is relatively slow. By only duplicating data that is new, you can save time. The third feature allows you to copy the disk's directory to track 34 of the disk and then recover it if ever necessary. Apparently most disk faults lie in the directory track so having a spare could be a data saver.

The documentation that comes with the package is 19 typewritten pages long. There are parts that I don't feel are very clear and should be rewritten. In fact, I would suggest an additional two or three pages should be written in a tutorial format to help the user better understand what the package will do. To use the program you need 32K Extended BASIC, at least one drive and a printer.

I think this package has the potential to be outstanding with a few changes. As it stands now I would only recommend it to someone who has enough knowledge of BASIC to make the package truly useful to them.

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Elusive Adventure In *Evasion*

Evasion is a text Adventure written in Extended Color BASIC. Now, before you go writing this off as just another BASIC Adventure program, read the review and let it stand on its own. This Adventure adds a new twist to the standard Adventure pattern. In almost all Adventures, when you solve it once, you can solve it over and over again in the same way. *Evasion* adds a new twist by changing the location of some of the objects and changing some names. This adds interest to keep you playing the Adventure even after you have solved it for the first time.

The instruction sheet that comes with *Evasion* is a photocopy of the basics of how to load and run the Adventure. It also gives you an idea of what you have to do.

Your mission, very simply, is to radio a British submarine to come and pick you up. You start out in the forest near a German prison camp you just escaped from. *Evasion* is written very smoothly, making it easy to play. It does use some German words, which for those of you who don't know German, or can't find a German-American Dictionary, can be very confusing. This Adventure has one thing for all of you who always wondered how you could carry around five or more items and still move freely — a bag to put things in. *Evasion* has many objects to deal with and, if you get stuck, try and use the objects together in different ways. *Evasion* also gives you a list of all the verbs it knows at the beginning of the program.

A small annoyance that disk users have to endure is that the program will not run with the disk cartridge inserted. To run both *Evasion* and *Mother Lode* (see below) you must remove the disk cartridge (because it needs the extra 2K that the disk cartridge uses). This is a pair of programs that really uses a full 32K of memory. The repeated removal and insertion of the disk cartridge could cause some problems, so I suggest that once you unplug the disk cartridge you leave it unplugged for awhile.

Mother Lode is a free Adventure program that you can get when you buy *Evasion. Mother Lode* is a search for the mother lode of gold (what else?). The instruction sheet that comes with it is a photocopy of the instructions and the basics of how to play it. *Mother Lode* is not like most other text Adventures. You don't type in the words for what you want done, but you simply select from a "choose" list of up to four choices. It can get boring pretty fast, with a limited number of choices. To solve this Adventure all you have to do is choose selections in the correct order. Because of this fact, *Mother Lode* would be good for someone who has never played an Adventure before. *Mother Lode* is a relatively easy Adventure to solve. A so-so Adventure, but not bad for being a free program.

Overall, *Evasion* has the potential to keep you working at it for twice as long as regular Adventures. With this Adventure's wide variety of happenings and the free Adventure you get, this package is quite a deal. As a veteran of many Adventures, I would rate this one as medium in terms of toughness to solve. To become good at *Evasion*, it does require being able to figure out how objects work together.

(Pal Creations, 10456 Amantha Ave., San Diego, CA 92126, tape $19.95)

— Jeffrey Loeliger

One-Liner Contest Winner . . .

Here's one of our favorites at THE RAINBOW. Type in the program, *RUN* and you'll see stars!

The listing:

```
0 PMODE4,1:PCLS:SCREEN1,1:FORB=1
TO175:CIRCLE(128,191),B,,.25:NEX
TB:DRAW"BM128,148E3U4H1U1E1R1F1D
1G1L1D2R2L4R2D2F2":FORS=1TO250:X
=RND(256)-1:Y=RND(148):C=RND(9)-
1:PSET(X,Y,C):NEXT:FORR=1TO7:CIR
CLE(235,20),R:NEXT:FORB=1TO9999:
NEXT
```

Michael Cooney
Mansfield, OH

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book Of Adventure* and its companion *Rainbow Adventure Tape*.)

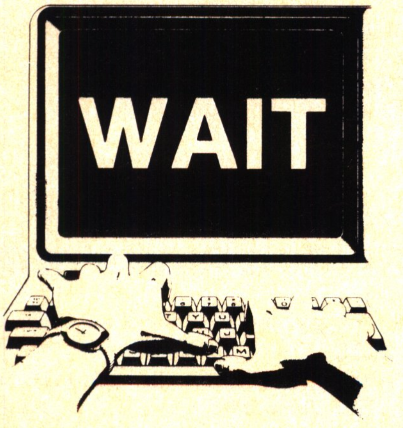

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Chart Your Family Tree With *Ancestors 2.0*

If there is an area in the CoCo world which has been more or less neglected, it is the field of genealogy. I will admit there are programs which were aimed at the genealogist, but there is nowhere near the choice one has in other fields. And there are fewer genealogy programs for the Color Computer compared with offerings for other machines.

Glenn Knight's tape program, *Family*, was one of the first real breakthroughs for me. It was a light in the forest.

Within the limitations of the tape files, *Family* was superb. Then, a few months later, *Family* owners got a card from Glenn Knight telling them of this great new program, *Ancestors*. Not only did Glenn say it was a good program, he said he had cooperated with the writer, Christopher Meek, to produce a method by which *Family* files could be transferred to *Ancestors* and still be used. That program was *Ancestors 1.1* and I bought it. *Ancestors 2.0* is a complete update of the first program and a real advance for the genealogist. There are several requirements of the genealogist which I would like to describe before reviewing *Ancestor 2.0*. First, there is a need for a sufficient number of files with appropriate information, much of which is standard to all genealogists. There is also a need to express that information in charts (family tree) and records (family record sheets). There is the additional need for the ability to call up individual records, but to link them to other records in the file. That is a big order for any computer and especially big when you consider the memory constrictions of 32K (or even 64K). *Ancestors 2.0* does all of these things for you even if a bit slowly!

Since I have been using the granddaddy of this program for many moons, this is something more than a cursory review. I know the improvements in the *2.0* programs and I have experienced any shortcomings it may have been designed to meet. There was no family tree chart with the original program, but there is with the *2.0* version. It is a very abbreviated chart, but Chris Meek told me he is working on an upgrade because some other folks had mentioned it.

By the way, if you own *Ancestors 1.1* your files are not quite compatible with *2.0*. Have no fear, Chris has a fix which is part of the upgrade for former owners.

One of the most disconcerting features of the old *Ancestors* program was that it searched the world every time you asked it for a record. The *2.0* version has rearranged the flags and that does not happen now. That is also the cause of the difference in the files.

Ancestors, written in BASIC, is a user-friendly, menu-oriented program which is very easy to use. The current edition will adapt to one or two disks and 16 or 32K. Those parameters are set in the loading program which accompanies the billboard.

The documentation is sufficient, and presupposes some knowledge of genealogy. There are eight pages printed on both sides. The various sections are numbered, but there is no index.

When you begin this program there is a sub-program which you can use to initiate the file disk. The routine permits you to create up to 500 individual direct access files which will be used by the program. Each file has 22 categories. These may be retrieved in two fields; name and record number. They are linked through other relational fields such as father's and mother's number and spouse's number. It is a very neat way to file the needed records and produce them in an orderly fashion.

Many of the file manipulations and searchings of *Ancestor* consume a great deal of time, but the result is well worth it. This program does not snap right back at you, but it does give you the right answers in the accepted form.

In addition to producing the three-generation family tree and a family group sheet showing several levels of relationship, it prints blank forms for both of these activities. That is almost worth the price of the program to the genealogist who uses scores of such forms in his research. I was able to make copies of several group sheets for a distant cousin, and even with the slow search of ancestors and my stodgy old DMP-100 I got them done 20 times faster with *Ancestors* and with less aggravation, too.

This program can be adapted to your printer. It is programmed for a DMP-400, but if you know the codes, Chris will tell you the places to put them.

The author tells me he is anticipating making the three-generation family chart into a five-generation chart which would meet the requirements of more genealogists.

There is something very comforting about Chris Meek and his response to the user. He sent me a two-page letter and documentation to help me with a problem I had. It was definitive information and was presented in such a way that I knew the author really cares about the programs he sells.

After having used *Ancestor 1.1* for some time, I feel free to say *Ancestor 2.0* is a welcome improvement which makes a valuable asset more valuable to every genealogist. If you are operating under 1.1 you can upgrade for $10. If you don't have a genealogical program, it is a good place to start.

(Autumn Color Software, 4132 Lay Street, Des Moines, IA 50317, $39.95, disk only)

— Howard Lee Ball

One-Liner Contest Winner . . .

Here's a tribute to science fiction buffs. Type *RUN* and a rocket, planet and stars appear.

The listing:

```
1 PMODE4,1:PCLS:SCREEN1,1:DRAW"B
M118,99M106,107M104,115M78,133M7
1,152M93,141M108,119M117,117M126
,105M113,111M118,99":PAINT(88,13
5),1,1:FORX=1TO99:PSET(RND(255),
RND(199),1):NEXTX:PMODE3,1:CIRCL
E(230,168),69,3:PAINT(230,168),3
,3:FORX=1TO9999:NEXTX
```

Charlie Fulp
South Boston, VA

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book Of Adventure* and its companion *Rainbow Adventure Tape*.)

Command The Briny Depths With *Gray Lady*

The last time I was in a submarine was at Disneyland — it was a fun ride. You got in, the ship dived and you viewed the wonders of the deep through a porthole. It didn't really matter that the water was only five feet deep and the atomic submarine was rolling around on tracks in a man-made lake; like everything in the magic kingdom, if you wished hard enough it became real.

In keeping with the non-violent character of the park, the submarine didn't torpedo anything or launch any missiles. Unlike Disneyland, the subject of this review, *Gray Lady*, allows you to exercise your latent predatory tendencies all you want.

In this game, you are a submarine commander trying to sink the enemy. To succeed in this four-screen, arcade-type game, you shoot vertically launched torpedos at four types of enemy ships, moored mines and depth charges. If you can beat the clock (about one minute), and destroy at least 40 percent of the enemy forces on each screen, you advance to the next screen.

Although you are the commander, you view the battle from outside the ship. Your submarine is at a constant depth. The sub is controlled by moving the joystick left or right until you feel you are in position to launch your torpedo and blow up an enemy ship sailing across the surface of the water. The smaller and faster the ship, the more points scored. If you're good enough, you may advance to the next screen, with added obstacles (mines and depth charges) to hinder your sinking of the ship.

The game is enhanced by the addition of voice. Utilizing a Voice Pak with a Votrax SC-01 speech synthesizer and Del Software's *Translate* program, *Gray Lady* will talk to you. This was the first talking machine language program I've used with my Spectrum Projects Voice-Pak. The graphics are very nice and the speech is understandable when compared to the BASIC talking programs. Although used sparingly, speech adds a nice dimension to the game. If you don't have a Voice-Pak it plays the same way only without speech.

The game, although well executed, offers limited control over the submarine — only left, right and fire controls. There are not a lot of things happening to hold your attention. After zooming left and right on the screen, and shooting at ships for a couple of rounds, I wanted to surface and do something else.

Despite its limitations, I enjoyed commanding the *Gray Lady*.

(Jarb Software/Hardware, 1636 D. Ave., Suite C, National City, CA 92050. Requires 32K ECB, speech requires SC-01 Voice Pak, cassette $19.95, disk $24.95.)

— Bruce Rothermel

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Pre-Schoolers' Educational Fun With *First Games*

First Games is a well-designed package of fun educational games for pre-schoolers ages three through six. The package includes a printed card with descriptions of available menus, games and instructions with just the right amount of detail. The programs are written in BASIC and require a 32K Extended BASIC System. The tape gave no problems in the loading process, and was used several times. With youngsters of four, five, and seven, that's amazing!

The games include exercises on such things as matching colors, letters and shapes, as well as counting and recognition of lowercase letters, memory exercise and 'which one is different' selections. The educational value for young ones is first class. My four-year-old took to these immediately.

There is a primary menu which gives three selections as follows:

A. Color Number and Memory Shapes
B. Color House and Alphabet Shapes
C. Which Is Different and Counting Blocks

The directions give sufficient descriptions and instructions for making selections and returning to the menu. The only problem I observed in the entire process had to do with the menus. It appears that in order to return to the primary menu you must complete a game. If you return to a menu during a game you may only select from the second level menu. More than likely you would want to get to the primary menu to get a different game. A couple of the games take longer to play to completion and if you are not doing well you may want to get out of it. You can always use the BREAK key and *RUN* the program again. This problem was minor and should not defer purchase of these programs if you can use or want them.

The second level menu for selection 'A' gives options for selection of:

1) Color Numbers — this game requires you to press the numbers keys. As each key is pressed it appears on the screen, in an enlarged form, and each number may be a different color. The object is to press each number until all the numbers are the same color. When this is accomplished, a computer-like figure appears and dances down the screen erasing the numbers as he goes. You then have the options of replaying that game, going to memory shaping, or returning to the primary menu.

2) Memory Shape — This displays eight figures of varying colors and locations with one matching shape displayed at the bottom of the screen for a brief viewing. The idea is to select the appropriate shape by typing the corresponding number. If you need to take another peek, you may press the space bar. My little ones found that this was not required often.

From the primary menu, using selection 'B' you get to select from:

1) Color House — an interesting game which has a

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'worm-like' figure crawling across the screen to a colored house. When he arrives at the front door he will ring the bell. If the house is the same color, the worm will be allowed to enter and a solid colored block will appear at the top of the screen to show you how many houses have been entered. To change the color of the house you must press the space bar. I found that this took some practice to get the correct timing down pat. After all eight colors have been scored, you may return to the menu or replay the same game.

2) Alphabet Shapes — requires that you match the shapes of lowercase letters. A letter is displayed in a box and by pressing the space bar you proceed from 'A to Z', stopping when the letters match, to type the number '1' to tell the program that you think the shapes match. If you are correct, the letters are displayed with the 'alphabet song'. Again, you have the option to replay or get the primary menu.

Selecting option '3' from the primary menu allows access to:

1) Which Is Different — this game allows for selecting the one shape of four that does not match the others. The selection is made by entering a corresponding number and correct selections are scored at the bottom of the screen.

2) Counting Blocks — this game allows you to draw a surprise picture by counting the number of blocks displayed. Entering the correct number adds another section of the picture, which is displayed as each correct selection is made.

First Games is a first-class educational game package. It is directed at pre-school children and should meet their requirements quite nicely. I commend the author and distributors for making these kinds of quality educational packages available.

(Computer Island, 227 Hampton Green, Staten Island, NY 10312, 32K ECB, tape $24.95, disk $27.95)

— Tony Compton

DEFT *Bench* and DEFT PASCAL: Improved Software Workbench

The January 1984 issue of THE RAINBOW carried a review, which I wrote about the *Colour Software Workbench*. That review version was 2.0. Since then the package has undergone a few changes and some rather interesting additions. The subject of this review is those changes and additions and their effect on the package as a whole. Before I begin, there is one item that needs to be mentioned. The name of the package has been changed from *Colour Software Workbench* to DEFT *Bench* and DEFT PASCAL. The folks at DEFT Systems, Inc. have unbundled their software such that you are not required to purchase the entire package if you do not desire to do so. See their ad in any of the latest RAINBOW magazines for particulars.

In the January review, I stated that I felt the programs and documentation were of excellent professional quality. Well, nothing has changed to alter that opinion. Indeed, the following additions only further enhance an already excellent package. The thought and skill that went into these additions, I think, are outstanding. The DEFT Systems people have put together a package which is a complete PASCAL and/or assembly programming environment that is reasonably priced and works like a champ.

First, let's look at just what changes have been made. The original 2.0 version lacked a floating point arithmetic package. What that, in essence, meant was that the PASCAL compiler, like many of the compilers on the market, could only handle whole or integer numbers.

Version 3.1 of DEFT PASCAL has floating point arithmetic added. The range, although not stated in the manual,

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appears from the tests run to be 1.0E+64 to 1.0E-64. That is significant for an eight-bit implementation. The addition of the floating point package added the following functions; ARCTAN, COS, EXP, LN, MARK, NEW, RELEASE, SIN, SIZEOF, SQR, and SQRT.

Of the above listed set, the following are not directly related to the math package, but instead provide more versatility to the compiler. The MARK, NEW and RELEASE functions deal with allocating and deallocating heap and can be very helpful in building linked lists in memory. In order to implement these functions, it is necessary to also support pointers, which this package now does. The SIZEOF function will give you the size in bytes of any variable. This function is of importance when dealing with string variables. The ARCTAN, COS, EXP, LN, SIN, SQR and SQRT are the standard math functions found in all compilers.

Along with the floating point package comes a library program which will allow you to build your own library files. The previous version of DEFT *Bench* and DEFT PASCAL allowed you to build modules and interfaces, which could then be linked into your program. However, there was one drawback to that scheme. Each module had to be in a file by itself and had to be specifically mentioned at link edit time.

The new version of the "LINKER" has provided the option of building a library of modules on a single file. Then at link edit time, only those modules referenced in the program or subsequent procedures will be pulled from the library file and linked to the program. The number of library files that can be used during any one link edit run is 50.

A new program has been added to the DEFT system disk called "LIB." This program will manage the library files for you, giving you the ability to add and delete modules from any given library file. This is an excellent addition to the already excellent product. The library concept can make life ever so much easier. Just imagine not having to recompile a graphic or sort routine every time. Simply place it in the library in compiled form and pull it in at link edit time. All one has to do is declare the procedure to be external and reference it at will in the program. The addition of the library concept will slow down the link edit process, but not enough to be noticeable.

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b & b software

DEFT *Bench* and DEFT PASCAL also now support the 64K CoCo. What that means is that if you have a 64K CoCo, all the DEFT programs will use the entire 64K of memory. The BASIC and Disk ROMs are totally disabled and not used. Thus, when you run your programs, you have the full capabilities of the machine at your disposal. Also, you do not have to be bothered by the already known problems with some of the BASIC math routines and the problems associated with Disk BASIC. It is really nice to see the text editor come up with a buffer space of over 42K bytes.

Along with all of that, the manuals have been completely rewritten and printed in a new format. They are now spiral bound, printed on glossy stiff paper and have a size of 5½ by 8½ inches. They are nice sized and will lay flat on any surface.

DEFT *Bench* and DEFT PASCAL remain an excellent example of what can be accomplished in the CoCo world. The entire package gives you all the necessary tools to learn PASCAL.If you already know PASCAL, then it gives you a total development environment. Nothing is missing, there is nothing else to buy. DEFT *Bench* and DEFT PASCAL consist of the following items:

1) PASCAL Compiler
2) 6809 Macro Assembler
3) Link Editor
4) Symbolic Debugger
5) Library Manager
6) Text Editor
7) Text Formatter

Also, while I am on the subject of learning, there is something I would like to mention. The College Entrance Examination Board has chosen PASCAL as the programming language underlying its Advanced Placement Computer Science examination in computer science. The importance of this decision is considerable. Any college applicant attempting to obtain advanced credit will be required to know PASCAL in order to complete the exam. DEFT *Bench* and DEFT PASCAL provide an excellent learning environment. The entire package is impressive. It is very well-written and extremely easy to use. In all the years I have been looking at software packages, never have I seen so much offered for so little. I have been doing reviews for THE RAINBOW for almost two years now and this has to be one of the finest packages I have seen to date. As I stated in my first review, "I am totally impressed with the professional quality of the programs and documentation." They are excellent.

(DEFT Systems, Inc., P.O. Box 359, Suite 4, Damascus Centre, Damascus, MD 20872; DEFT PASCAL $79.95; DEFT *Doc* $39.95; DEFT *Bench* $49.95; Complete Package $119.95)

— Frank J. Esser

Creating Bar And Pie Charts With *The Zapper Family*

What would you expect a program titled *The Zapper Family* to do? Most likely it would be an arcade game with mutant aliens attacking the peaceful citizens of Pleasantville and your mission would be to zap these enemies of humanity and save Earth from the electronic invasions. Not this time! This is usable, business-oriented software for the CoCo.

The Zapper Family is a group of high resolution graph-generating programs which allow the Extended BASIC 32 or 64K CoCo to create line, bar or pie charts on the screen and print them using a screen print program and dot-matrix printer. The graph generating programs included in *The Zapper Family* are the graph zapper, which creates line graphics; the bar zapper, which creates bar graphs; and the pie zapper, which creates pie charts.

Versions of all these individual programs have been previously reviewed in THE RAINBOW: *Graph Zapper* in the December '82 issue, *Bar Zapper* in the April '83 issue, and *Pie Zapper* in the October '83 issue. You may wish to dig into your archives to get the full scoop on the graph-generating programs. Each feature uses a series of menus and screens to allow the user to input, edit, and review the data which then generates the graph. The data then can be saved onto either tape or disk for retrieval or modification later.

The Zapper Family includes updated versions of the three graphing programs. Changes are made primarily in the handling of the graphics of the title area for better readability, and in the handling of the programs with multiple drives.

My office computer is a Mega-K IBM PC. While it is very nice for word and data processing because of its memory and monitor, I use my trusty 80C home computer and the appropriate *Zapper* program to create my graphs. The cost of upgrading the IBM to high resolution color capabilities far exceeds the entire cost of my CoCo system. The IBM software costs more than a 64K CoCo.

A graph takes the jumble of numbers generated by the spreadsheet program and makes the information understandable. To borrow a phrase, "A graph turns a sea of data into data you can see."

I have been using a spreadsheet program to generate the data and then transfer this information to the graphing program. This is where the latest "zapper" in *The Zapper Family* is used.

The *Spreadsheet Zapper* doesn't generate a graph per se: It converts *Spectaculator* files to something that can be understood by the three *Graph Zapper* programs, eliminating the need for manually inputting the data.

First, you perform your calculations using *Spectaculator*, saving the results to tape or disk. Then run the *Spreadsheet Zapper* to select and convert the chosen file and graph your calculations using any of the three *Zapper* programs.

To accomplish this you need a 32K Extended BASIC CoCo, a tape recorder or disk drive, and the ROM Pak or disk version of Tandy's *Spectaculator* program.

It is unique to find a high level business application program available on both tape and disk. It is immeasurably easier to use the *Zappers* on disk. After you first transfer the disk version of *Spectaculator* to *The Zapper Family* disk, all the *Zapper* programs and files are available to be chosen from a menu.

With tape, you are required to use the ROM Pak version of *Spectaculator* and change tapes often to save and load files and programs as required.

While the disk system is faster (and utilizes a more featured version of *Spectaculator*), it was considerate of Southern Software to develop a separate tape version for those who need high resolution graphing but can't afford a disk system.

I have both versions of *Spectaculator*, the ROM pack/tape version which were purchased before upgrading to disk. Both work well with the *Zappers*. I got out some of my old *Spectaculator* files and shortly was creating graphs using the data contained in them. Some of the results were startling.

One of the things I use *Spectaculator* for is tracking personal investments and net worth. The spreadsheet makes it easy to calculate return on investment and determine ahead of time the results of various possible alternative investments.

The surprises were in seeing the total net worth line rise and fall over the last few years. The numbers were always there, but it is very dramatic watching that line rise and plunge. No doubt about it, graphs have impact.

The Zapper Family can be purchased in increments to meet your needs (and pocketbook). Any or all of the *Graph Zappers* can be included with the *Spreadsheet Zapper* at initial purchase or added later. *Spectaculator* has to be purchased separately from Radio Shack.

As typical with Southern Software Systems user guides, the documentation (21 pages) for the *Spreadsheet Zapper* is superb, allowing competent operation by a user having no prior experience. The pitfalls of possible entry errors are pointed out, and helpful hints abound.

The Zapper Family is an exceptional group of programs for the Color Computer. For business and serious home applications, the value of generating high resolution graphs far exceeds the reasonable prices of the programs.

The limitations of *The Zapper Family* are not found in the Southern Software zapper programs, but in the Radio Shack *Spectaculator* spreadsheet program.

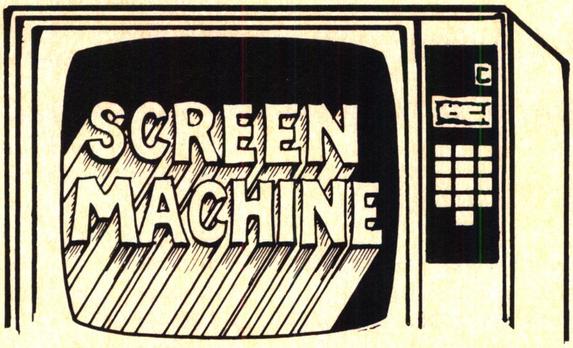
In summary, if you are pleased with *Spectaculator*, you will love the *Spreadsheet Zapper* and the rest of *The Zapper Family*. The good news is that the remainder of the *Graph Zapper* programs will work without the *Spreadsheet Zapper* and are available separately.

(Southern Software Systems, 485 South Tropical Trail, Suite 109, Merritt Island, FL 32952. *Spreadsheet Zapper*, tape $17.95, disk $25.95. *The Zapper Family* complete, tape $59.95, disk $79.95)

— Bruce Rothermel

Sugar Software

Sugar Software



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Music Library 100 — A Notable Program To Make CoCo Sing

One of my most treasured possessions is a 1946 Wurlitzer 1015 Jukebox. If you've seen the TV program "Cheers," you've seen this magnificent music machine with its colored pilasters and bubble tubes running up both sides of the apparatus.

I now have another jukebox. While it is contained in a small mild-appearing gray case, rather than in a wood and chrome structure, it sure does create some pretty tunes. This new jukebox is my trusty ol' CoCo equipped with the *Music Library 100* program from Speech Systems.

Music Library 100 is a series of musical songs created using Speech Systems *Musica* and *Musica-2* programs. The *Music Library 100* lets you play the songs created by the author (musician?). You cannot create your own tunes or modify the existing songs without obtaining the *Musica* program.

When the programs are run, a menu showing the available selections is displayed. You then have the option, just like my Wurlitzer, of playing any available selection and it doesn't cost a nickel a tune. If desired you can play multiple selections by selecting the numbers of the songs. The selections are then automatically loaded and played.

Wandering from the main topic of the review, the similarity between a 45 rpm record and a 5¼-inch floppy disk is amazing. They're both about the same size, have a hole in the center and spin when they are played, and of course audio and digital cassette tapes look identical.

For those of you who are familiar with the sounds created by using the *PLAY* and *SOUND* commands, you are in for quite a pleasant surprise when you hear the sounds created by *Music Library 100.* Instead of a single note being played at a time, up to four notes or tones can be played simultaneously. The results are similar to the sounds created by a Moog synthesizer. At first I was disappointed by the quality of the sound generated through the speaker of the TV I am using as a monitor. There was no bass, and if I turned the volume up loud, the speaker distorted the music so much that it turned into annoying fuzz.

The solution was to plug an external speaker into the external speaker jack. What a difference! The full tonal range that the composer had in mind could be heard. Speech Systems also sells a Stereo Pak which plugs into your ROM port to direct the music to your stereo system.

Whether or not you will be enthralled with *Music Library 100* will depend on your musical tastes. A wide selection of music is included:

- music from stage, screen and TV (11 selections, 17 minutes)
- music of the '70s (10 selections, 20 minutes)
- music of the '60s (11 selections, 18 minutes)
- music of the '50s (11 selections, 18 minutes)
- old time favorites (13 selections, 15 minutes)
- classical (6 selections, 14 minutes)
- Christmas music, popular (11 selections, 17 minutes)
- Christmas music, traditional (11 selections, 15 minutes)
- patriotic (11 selections, 15 minutes)
- polka party (10 selections, 17 minutes)

Each song can last up to about 3.5 minutes.

After listening to the selections, I was curious as to how the CoCo could create these melodies. Speech Systems' explanation is:

> *Musica-2* generates a stream of numbers that the Color Computer converts to voltages through the sound port (6-bit digital to analog convertor). By varying the numbers and thus the voltages at the appropriate rate, a tone is produced through the TV speaker. The rate at which the numbers are sent to the sound port is fixed at about 8,000 numbers per second. Pitch is varied by skipping a certain number of values in the tone table. Thus, a tone that is generated by skipping every other number is an octave higher than one that utilizes every number. This method of varying pitch makes it possible to produce more than one note at once, each independent of each other.

If you understand this, great, because I don't. I'll just enjoy the music and think of it as being more CoCo magic. Actually, I want to further investigate the possibilities of creating some music of my own now that I've heard what the Color Computer can do. With *Music Library 100,* Speech Systems has created a neat little hook to sell a lot of *Musica-2* programs.

It is available in both tape and disk versions. However, the disk release is much more usable as it allows instant random access to any of the selections contained on the disk.

If you have a 32K Extended BASIC CoCo and an urge to hear what beautiful music your computer can make, you might want to check into *Music Library 100.*

(Speech Systems, 38W255 Deerpath Rd., Batavia, IL 60510, tape $34.95, disk $39.95)

— Bruce Rothermel

One-Liner Contest Winner . . .

Here's a one-liner which produces pretty patterns of lace in any size you'd like. Just type and *RUN*, choose the desired lace size (1-9), and see the colorful pattern.

The listing:

```
0 CLS(0):PRINT@235,"***LACE***";
:PLAY"FDGD":FORA=1TO1000:NEXTA:C
LS:INPUT"TYPE IN SIZE OF A LACE(
1-8)";B:B=B+3:IFB<4ORB>11THEN0EL
SEC=RND(3)+1:PMODE3,1:PCLS:SCREE
N1,0:FORD=10TO242STEP8:FORE=10TO
178STEP8:CIRCLE(D,E),B,C:NEXTE,D
:FORF=1TO3000:NEXTF:GOTO0
```

John Printz
Sinking Spring, PA

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book Of Adventure* and its companion *Rainbow Adventure Tape.*)

K-BASIC: A Better System Environment

By Dale Puckett and
Bruce Warner

There are hundreds of compilers available for more than a hundred programming languages used on hundreds of computers sold these days. They all have their strengths and their weaknesses. Some languages are designed for precise scientific mathematics. Some are designed to be interactive with the programmer. Still others are designed to process massive files of records for financial institutions.

A financial institution has little practical desire or need for a compiler that will go to 64-decimal places of precision arithmetic, and a compiler designed for scientific notations has no practical need for the ability to sort sequential data files into alphabetical order in record time.

The Beginner's All-Purpose Symbolic Instruction Code (BASIC) was developed at Dartmouth College almost 20 years ago. Doctors John Kemeny and Thomas Kurtz could be considered the fathers of BASIC because they were the first to implement the language into a computer system (a General Electric 225).

Ease of use is the primary advantage of BASIC. A variety of BASICs has been introduced to help improve the language, but most serious programmers still do not recommend its use in a professional programming environment. We both try not to recommend BASIC because it lends itself to the promotion of sloppy programming habits. On the other hand, BASIC is easily learned and it may be just right for your home programming needs.

K-BASIC is an Extended, not Extended Color, graphics compiler for the CoCo that has several additional features, making it easy to use structured programming and help you stop complaining that BASIC is a non-structured language. Twelve-character variable names help you write self-documenting code, reducing the need for page after page of comments. A variable name like *"PCent Rate"* is much easier to figure out than 'P'.

There are a variety of compilers running on the Color Computer, so it shouldn't be a surprise that they resemble Radio Shack's Disk Extended BASIC. *K-BASIC* is one of the closest we've seen to date.

Reading the manual, you'll find that you could almost key in your Radio Shack BASIC programs and run them under FLEX or OS-9 using *K-BASIC.* Both the commands and the format are similar. There are a few limitations which we'll get to later. But there are some enhancements to Radio Shack BASIC as well.

K-BASIC proves, more than anything, that every purchase for your Color Computer is a trade off. When you decided to go to one of the true operating systems (like FLEX or OS-9), you decided to trade off the perfectly good (not great) Radio Shack DOS for something that offers more flexibility (not to mention more data storage, additional applications capabilities and a whole new world of serious business software). You also had to make the deci-

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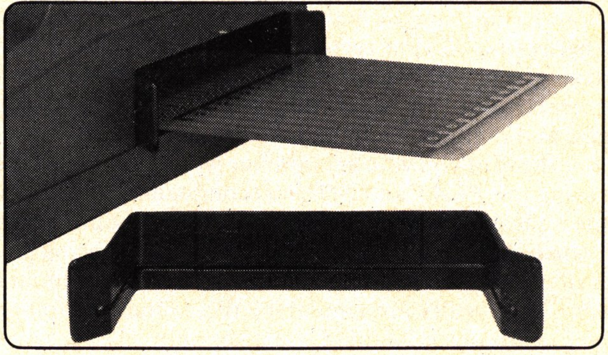

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sion to invest in new programming languages, and to learn more about your CoCo.

There are those that feel OS-9 and FLEX are too advanced for a small computer, but as someone said at a computer meeting a few weeks ago, "Most people like to stay with Radio Shack's DOS because it gives them an excuse to remain ignorant." Going to OS-9 or FLEX will necessitate that you learn something about computer systems, in exchange, you will learn more about the actual operation of your Color Computer, and computer systems in general, than you ever thought you'd even want to learn. That knowledge will pay off in increased productivity from a little game machine (isn't that what Radio Shack is still trying to convince us that it is) than some people can get out of their $2000 systems.

K-BASIC is not cheap. It comes with a price tag right at $199. IBM software starts at $500. For $199 you get the *K-BASIC* Compiler, a Run-Time Package and Lloyd I/O's OSM Extended Macro Assembler. We've been told by Lloyd I/O that you can purchase *K-BASIC* without the OSM assembler for $125, but if you don't already have a good assembler for OS-9 or FLEX, you'll want OSM for the added $74 (OSM costs $99 on its own).

Graphics commands are missing entirely from *K-BASIC*. It is not meant for the development of charts or games. It is designed for more serious uses, including 15-digit real numbers or up to 64-bit double long word integer numbers. That gives you whole numbers from -36,028,797,018, 963,968 to +36,028,797,018,963,967. It's hard to imagine needing that large a number for any of your home financing programs on a home computer, but scientists may be interested in really *big* numbers.

Real numbers are stored and manipulated (or processed) in BCD (binary coded decimal) format, and require a slightly longer time to compute once compiled. Their advantage is the precision they offer; the execution time is a small price to pay if you're interested in being exact.

Integer numbers are stored in their binary format and take less time to compute. If your decimal places aren't important, you may want to use integer numbers for greater speed; this could help cure the time complaints about BCD arithmetic.

Lloyd I/O's *K-BASIC* for the OS-9 version uses nothing but BCD arithmetic, but is being modified to use binary math for integer numbers. That should resolve rumored complaints about the OS-9 version's slow execution time of compiled programs under OS-9. The trade off this time —saving time will add to the probability of errors when computing large numbers.

There are six major types of variables with six subdivisions for each and three sub-types each. The major types are: real numbers; character strings; signed eight-bit byte integers; signed 16-bit word integers; 32-bit long word integers; and signed 64-bit double long integers. The added subtypes are non-subscripted, single-dimensioned and double-dimensioned arrays. Variable names are from one to 12 characters long and all 12 characters are significant. The variable names can be in both upper- and lowercase (all are read as uppercase only when compiled), and numbers are allowed within the name (provided they are not the first character). It would almost take 64-bit arithmetic to figure out all of the possible variable names, so let's just say you can get very specific with naming your variables and not have to worry about remembering what you labeled a specific variable when you want to change the program a year from now.

Dimensioning of arrays is done in the standard BASIC format. The variables can be subscripted with other variable names during the actual program, but not in the *dimensioning* statement.

There is no *PRINT USING* statement, so you will have to develop a series of routines to develop your own printer formatting. Experienced BASIC programmers will not find that a problem, but beginners should be warned. Those older CoCo owners will remember not having Extended Color BASIC and be glad this is about the only place they have to revert to plain old Color BASIC.

Line numbers are optional. You can use line numbers for labels or the optional routine names (up to 16 characters long) for the label. If the first space of a line contains any character other than an asterisk, the word (or number) up to the first space is considered to be a label. If the first character is an asterisk, the line is thought to be a comment (typical of many compiler languages), and if the first character is a space, the first non-space character will be considered to be part of an executable statement. The exception to the above is when the first non-label, non-space character is part of the word *REM*, in which case the line will be considered to be a remark (the same as the asterisk).

It may be worth noting that Lloyd I/0 assumes you already know something about programming and programming environments when you begin reading their manual. It is written in such a way that you simply apply the appropriate commands to your own program in order to make it run. The standard conventions for defining your dimensioned arrays apply, and all variable names (up to 12 characters long) follow the same rules. Each of the six variable types is differentiated in that they each have a

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different last character (type suffix). Real numbers and string variables are terminated in the same manner as in Microsoft BASIC (no suffix for real numbers and a dollar sign for string variables).

The prescribed characters available through *K-BASIC* are ASCII (American Standard Code for Information Interchange) characters $20 (or 32 in decimal — a space) through $7F (125 decimal — a tilde). Other ASCII characters that may be required for printer output or the like will require the use of the *CHR$* function.

Dimensioning is limited to two-dimension arrays, but the actual number of arrays seems to be limited only by memory restrictions.

Five mathematical operators are available (add, subtract, multiply, divide and exponentiation). Their order of execution follows the same format as Color BASIC (working from the inner most parenthesis out, exponential powers, multiplication, division, addition, subtraction, left to right in the event of a tie). This is one area in which the compiler has given you more than your money's worth. (Crunch COBOL compiler under FLEX requires each mathematical operation to be written in a single sentence [the equivalent of BASIC's program line]).

Another area completely implemented in *K-BASIC* is the gate logic operators, including the *COM* and *EOR* commands. Now if I want to say *IF I$ = "BRUCE" OR YOU$ = "DENISE" GOSUB PART-OF-FAMILY,* I don't have to add *IF I$ = "BRUCE" AND YOU$ = "DENISE" GOSUB ALL-OF-FAMILY* to the beginning of the *PART-OF-FAMILY* routine.

With all of these nice words about *K-BASIC*, you should be wondering why *K-BASIC* is a trade off as we said in the beginning of this review. Here comes the bad stuff!

K-BASIC has a few serious drawbacks because you have to write a number of routines to use a formatted output. To confuse matters even more, you must open a sequential file in order to output to the printer, then you must print to the printer buffer (buffer 0). This is not uncommon for higher level languages (or the Commodore 64), but those of you only accustomed to Radio Shack BASIC will find this annoying.

Compiling time is slow, but worth the wait when you start running your compiled programs in place of interpretive BASIC. If there is a reason for the thinking *K-BASIC* programs execute slowly, it is the BCD arithmetic, a small price to pay if you're interested in a high level of accuracy.

We found the people at Lloyd I/0 to be very helpful when called for help on how we should attempt certain routines with *K-BASIC*. This is worth noting in that they helped *before* they found out we were reviewing *K-BASIC* for THE RAINBOW. They do, however, prefer you write for assistance.

The manual has been modified since its preliminary release. The newer manual is said to have a complete alphabetical index in the back. Looking for a specific command is much easier to find in alphabetical order than in command type order, and that thought has been added to the newer manual.

Once compiled, the program is completely self-contained. This is worth noting in that a program you may want to market does not require the accompanying run-time module to be sold (and hence royalties paid) for its inclusion in the package.

Compiling time is long. It is estimated a great amount of the compiler time is due to disk access. All of the assembly source code for your program is contained on the disk, and copied to another segment of the disk to be later compiled by your assembler. The OSM (or Frank Hogg's ASM) assembler also reads from the disk and requires a long time to compile.

If you are running standard Radio Shack disk drives, and have been content with them till now, your naive satisfaction is about to come to a disturbing halt. We were absolutely estatic to have MPI 40 track, double-sided, double-density drives (2) on the CoCo used to review *K-BASIC* when we discovered the size of *K-BASIC*. With *SDISK* under OS-9 and using FLEX's setup command, we had full access to both sides, and all 40 tracks of each side. Our program disk contained both the *K-BASIC* compiler (along with all its run-time package) and a Crunch COBOL compiler, along with the entire FLEX operating system and a complete line editor.

With Radio Shack drives, you will need to change your disk four times. *K-BASIC* comes on two diskettes and the OSM assembler requires another 35-track disk. The editor will not fit on the compiler disk. Even if you only need three disks to store all of your compiler programs, you will need to change from the editor to the compiler to the run-time disk to the assembler, and require a second drive to store all of the compiler files. With all our years of experience on the Color Computer, we found it more than a little annoying swapping disks that many times (not to mention very confusing). Once you're used to it, it's something you can live with if you have to, but not something you want to put up with for very long. Recommendation? Make at least one of your drives a double-sided drive, and add *SDISK* to an OS-9 system. Since OS-9 is looking to become *the* operating system for the CoCo, we'd recommend the double-sided drives anyway (they cost a lot less than two single-sided drives and hold a lot more data!).

Another concern is that *K-BASIC* requires you to have an advanced Assembler ($100 or more if you don't already own one). That's about twice what you'll pay for BASIC09 or C from Radio Shack. Soon Radio Shack will be coming out with PASCAL as well, at a similar price which will add to the perceived high price tag of *K-BASIC*.

On the other hand, *K-BASIC* is neither packed down nor interpreted. Once you have your compiled program, you are finished with run-time package, and your program can be executed directly as its own command module.

Just as a side note, if you're interested in learning a few assembly language routines, we'd recommend keying in some very short programs and compiling them into their assembly language file to learn more about assembly routines. If you attempt this, remember that the routines you are looking at are only one of dozens of possible ways to perform a task. Although they may be correct for one function, they may prove useless for another operation.

If you aren't interested in learning another programming language, but are interested in programming your 64K CoCo under FLEX or OS-9, we'd recommend *K-BASIC* for you. It offers you the most common commands of Radio Shack BASIC with faster execution time, in a better systems environment.

(Lloyd I/O, 19535 NE Glisan Street, Portland, OR 97230, $199)

Quizspin — An Appealing Game For Adults And Children

If your family is among the millions that watch TV's "The Joker's Wild" after dinner each evening, you probably will be attracted to *Quizspin*, a new release from Spectral Associates.

The familiar three picture windows are here, one-eyed bandit style, and contain different graphic symbols. The number of matches within the windows helps determine the amount of earnings if you correctly answer the next question.

When the player presses any key, the categories spin within the boxes. The categories, along with the value, are presented. One picture is worth $50, two are $100, and three are worth $200.

The real attraction to *Quizspin* for parents is its adaptation of the TV game for educational purposes. The categories are:

Presidents — Asks for the chief executive of the United States and the order in which he served (first, second, third, etc.).

States & Capitals — Asks for the capital of a state, or which state a city is the capital of.

Chemistry — Asks chemical name of various symbols, or the symbol for chemical.

Math — Addition, subtraction, multiplication or division problems.

In place of the devil, there is a mystery category that selects any of the topics listed above.

The game requires 32K Extended BASIC and two players may compete in a game, with the option of playing to any amount between $500 and $9,000.

For the most part, I believe the program will appeal to youngsters in the elementary grades, especially when those topics parallel those subjects they are presently taking in school. The chemistry symbols will be useful to even high school students under similar circumstances.

I think the graphic appeal could be enhanced by doubling or tripling the size of the picture windows. They don't have much of an impact when they are only about an inch wide, as they appear in the current version of the game.

The game moves along at a fairly nice pace, and seems to have, for my nine-year-old son, the same kind of appeal that the TV version of "The Joker's Wild" has for many parents. The advantage for him, however, is that he is broadening his education.

(Spectral Associates, 3418 South 90th Street, Tacoma, WA 98409, tape $19.95.)

— Charles Springer

Autoterm: A Multi-featured Terminal Program

It sometimes seems that every terminal program I come across for the CoCo has some great flaw. With the number of first-rate terminal packages available for other computers, it would seem as though there could be a really good one for the CoCo as well. PXE Computing's *Autoterm* comes close to that goal.

Although *Autoterm* is primarily a terminal, it has a number of features that make it almost a full-featured word processor as well. This combination has some advantages; you can, for example, dump a file from a remote system into the text buffer and then, after you get off the system, edit the file and print it out with margins and other formatting without leaving the program. I don't know of any other terminal program that is integrated in this way.

Autoterm has Hi-Res text displays with full upper- and lowercase characters; this can range up to 64 characters in width. *Autoterm's* Hi-Res text capabilities even include 32 columns (great for CompuServe) and a 40-column display that matches what a lot of Apple-oriented bulletin boards put out. By contrast, the smallest Hi-Res text mode of some other programs, such as *Colorcom-E* and *VIP Terminal*, is 51 characters wide. The Hi-Res display is quite fast as well; it took a full 300 Baud transmission without noticeable delays (I did not try it at 1200 Baud).

Autoterm has its minor problems, though. The buffer stays open all the time; instead of opening the buffer at the beginning of a text file and closing it when the end is received, you position markers at the beginning and end of the portion you want to print or save on disk. If you have a big article or program to download, you may find that you don't have enough room because part of the buffer is wasted on the login sequence, system bulletins and other nonessentials. You can jump into the text editing mode, delete what you don't need and jump back before you start reading the file, but this is a bit clumsy. Another problem is that the program is protected by having a special hidden code on the disk that the program must find in order to work; one copy I had suffered some accidental damage, so I was down to a single disk. (The package comes with two copies of the program.)

All in all, *Autoterm* is one nice program — or is it two?

(PXE Computing, 11 Vicksburg Lane, Richardson, TX 75080, disk $49.95 plus $3 S/H)

— Ed Ellers

CoCo Dump 'Close To Perfection'

CoCo Dump is a highly advanced screen dump program for Epson printers (the MX series printers require Graftrax Plus) and the Gemini 10X and 15X. The program has some advanced features that set it apart from the other screen dumps on the market.

CoCo Dump runs on a 16K Extended CoCo (it would probably work on a non-extended computer, but you wouldn't be doing Hi-Res graphics on it anyway). Both tape and disk versions are available. You can relocate the program wherever you like; to put it near the top of a 32K machine you might use *CLEAR 200,&H7CFF:CLOADM "COCODUMP",16384* to load it. To make the actual printout, you would (after putting the printer on line) *EXEC &H3D00* for a 16K machine; the program asks you if you want normal or inverse printing and a large or small picture. With the press of two keys the process starts, and you come back to OK when it's finished.

The disk version has a nice addition in the form of a BASIC program that does screen dumps from disk files. When you use this, a directory of all binary files is shown and you use the up- and down-arrow keys to locate the one you want; pressing ENTER shows you the picture briefly, asks you if you really want to dump that picture, and then goes into the dump routine itself.

The pictures themselves are only slightly rectangular, and have almost the same proportions as the CoCo's display. You can dump a picture in either the large 7 x 7½-inch size or the small 3½ x 3¾-inch size. The program even puts a border around the picture.

The print quality is as good as anybody has a right to expect from a CoCo screen dump. The picture, at last, has the proper proportions; circles that you painstakingly adjusted stay adjusted. Image size is good and none of the picture is cut off at the sides. This program is intended only for *PMODE 4* pictures, so *PMODE 3* graphics will not come out in gray scale and the red and blue artifact colors will become alternating black and white vertical lines.

CoCo Dump is as close to perfection as anything of its type I've seen. About the only thing I know of that gives better results is a $400 Mitsubishi video printer — and even that has its quirks. If you have an Epson or Gemini printer, I don't think you can go wrong with this program.

(Spectrum Projects, Box 21272, Woodhaven, NY 11421 or Box 9866, San Jose, CA 95157-0866; tape or disk $19.95 plus $3 S/H)

— Ed Ellers

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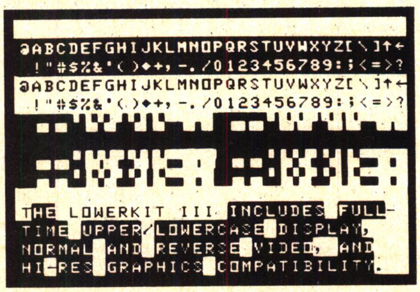

```
@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]↑←
 !"#$%&'()*+,-./0123456789:;<=>?
@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]↑←
 !"#$%&'()*+,-./0123456789:;<=>?

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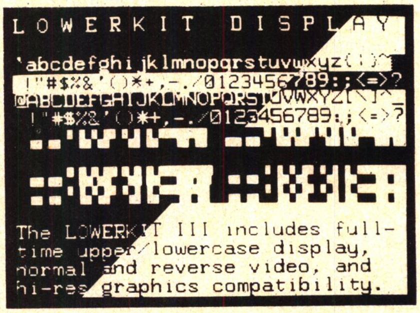

```
LOWERKIT DISPLAY

`abcdefghijklmnopqrstuvwxyz{¦}~
 !"#$%&'()*+,-./0123456789:;<=>?
@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_
 !"#$%&'()*+,-./0123456789:;<=>?

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```

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Three years ago, the Lowerkit made history and set the standard in Color Computer lowercase. For example, game and education programs from Sugar Software have Lowerkit display options. Spectrosystems' ADOS supports the Lowerkit; so does Cer-Comp's TextPro. Cartridge Scripsit looks beautiful with a Lowerkit. Spectrum Projects, Cheshire Cat and many others have developed beautiful alternate character sets which you can download from Micronet, burn into an EPROM, and snap into your Lowerkit.

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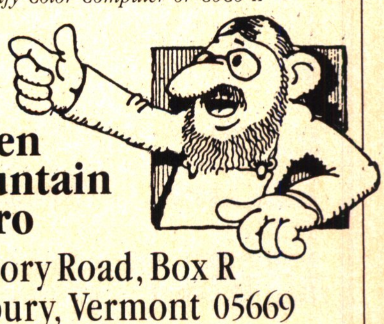

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Blast Those Mines With *Miner*

Miner is a machine language game written for the 16K CoCo with 1.0 or 1.1. BASIC. It is a one-player game with minimum action and animation. The game starts in the deep underground coal mine. The object of the game is to gather as much coal as possible before running out of dynamite. Points are given for each lump of coal you retrieve. Once your initial supply of dynamite runs out you are given more charges. The number of additional charges is based on your current score. Each time the screen is cleared of coal, you are awarded bonus charges.

The coal mine is actually a 14 x 16 grid. In this grid, 25 lumps of coal are randomly placed. You are also placed randomly in the grid. The rest of the grid is made up of stone which must be blasted. You move around (once you've blasted a tunnel) with the arrow keys. Pressing the space bar causes the dynamite to detonate.

The graphics are mediocre. The sound seems somewhat realistic. There are no bells and whistles.

The game is somewhat challenging in that you are required to place your dynamite charges strategically in order to get the maximum amount of coal using a minimum amount of dynamite. I would suggest *Miner* for the beginning game player. I think it would be an excellent game for a young child because it would teach him to use logic and familiarize him with the arrow keys. If you are an experienced game player or want a lot of animation and sounds, I don't think *Miner* is for you.

(The Dataman, P.O. Box 431, Station B, Hamilton, Ontario, Canada, L8L 7W2, $14.95 Canadian, $12.95 U.S.)

— Michael Hunt

Spell-N-Fix II Is A Quality Spelling Checker

Free software! I'm sure that if Star-Kits had a bigger "free" notice in their software ad they would be completely overwhelmed with mail requests. If you haven't noticed the ad, Star-Kits is distributing some of their software for the Color Computer in a rather unusual way. They call the method 'Pass the Hat' software. They will send you the software for "free." If you like it, they would very much like you to send a contribution. Star-Kit will obviously take any amount, but would be most pleased to receive the normal retail price of the program. When you receive the program you are invited to give it to all your friends and acquaintances who can use it. You realize that this is essentially the same network responsible for the wide distribution of unauthorized copies of much software. They are hoping that the software is good enough to impress many eventual users to thank them with a check. The intent of this experimental distribution technique is to improve profitability which is being hurt significantly by pirating. This is one of the few options other than making the software more copy-proof. Software locking techniques are expensive as well as only partially effective. Besides, they are an irritant to honest customers who need backup copies of their software.

Spell-N-Fix II is one of the programs being offered by Star-Kits in this fashion. It is a recently revised version of the original spelling checker program available for the Color Computer. Before being offered as a Pass the Hat program, *Spell-N-Fix II* was advertised at $69. Since this program is available with payment on approval, I will limit this review to a very brief overview so that you can decide if it is worth the postage to send for — an easy decision. Remember, Star-Kit wants you to send what you think the software is worth so, in essence, you will do your own personal review of this program in making that decision.

Spell-N-Fix II is designed for disk using RS-DOS. (Note: there are FLEX and StarDos versions of the original *Spell-*

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N-Fix, but not available as Pass the Hat programs.) It will work with a single drive but it will be necessary to eliminate some of the auxiliary files supplied on the disk. To facilitate easy distribution, the instruction manual comes as a text file on the disk. Also included on the disk is the original *Spell-N-Fix* program which uses the same core dictionary as the newer version. The original is included because it works somewhat differently and may be preferred for some situations. This program is designed to work with any ASCII text file and can be configured to work with any word processor. I have used it with *Telewriter-64* with no modification.

One of the most significant differences between the original and the new version is the screen display. *Spell-N-Fix II* uses a high resolution character set to show true lowercase characters. Also, the start-up routine automatically configures the operating system to use a 20 millisecond (ms.) track-to-track stepping rate instead of the normal 30 ms. This is very useful with a program of this type which accesses the disk so often. The higher stepping rate works with my disk drive; I have one of the original TEC version Radio Shack drives (lucky me). Faster stepping rates are also available if you have a drive that can handle it.

Operationally, another major difference between the original and the new *Spell-N-Fix* exists. The new version displays your file on the screen as it searches through the 20,000 plus word dictionary. This has mixed blessings. If you are correcting a long file, you may not appreciate the extra time that it takes, displaying each suspected incorrect word in context waiting for a response from the operator. But there is also a very big advantage to doing it this way. When a suspected word is found, you can enter the dictionary and look up similar words to see if you can find the correct spelling. This makes spelling correction very simple. This look-up feature is also available in lieu of performing a normal spelling check on a file. There are many convenience features like this built into the *Spell-N-Fix II* program. Of course, the standard features expected of a spelling checker, like adding your own words to the dictionary, are included.

I have used a variety of spelling checker programs on professional business systems. With software like this, the major difference between the Color Computer and a several thousand dollar business system is the lack of joystick ports on the business system. This is a very useful and professional program.

Let me end this review with this recommendation. If you are in need of a quality spelling checker, send a CoCo formatted disk to Star-Kits along with an addressed and stamped return mailer. You won't regret it. Remember that this is not really meant to be free software. Contributions should be made based on what you believe is the value of the program. This type of software distribution is unique and has many attractive features including the opportunity for the buyer to determine the value of the program from use rather then from an advertising description. This distribution method will only work and grow if the end users are honest and generous in their payment.

(Star-Kits Corp., P.O. Box 209, Mt. Kisco, NY 10549, RS DOS required)

— Tom Szlucha

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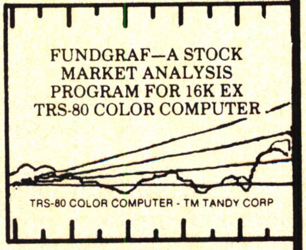

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Piratector requires a Disk BASIC system with at least one, preferably two or more, drives.

Semigraf

Included in the package is *Semigraf*, a graphic editor for the creation of nifty title screens. *Semigraf* was reviewed in the July 1984 RAINBOW and needs no further comment other than to say that it is well suited for this type of display and easy to use. Instructions are also given on conversion of graphic displays generated by other programs, such as *Art Gallery*, for use as title screens for your presentation.

Combiner

Another utility that is quite useful is named *Combiner*. This program allows the BASIC programmer to combine machine language subroutines with the BASIC program in a single file. The machine language program must be in position independent code as it is appended to the end of the BASIC program.

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Programming With Piratector

Piratector will protect both machine language and BASIC programs with a minimum of constraints. One important warning is given regarding memory conflicts. Specifically, a machine language program has to be located above the memory used for the title screen. Adequate discussion of this subject is in the 32-page user's manual including a memory map of the system.

After either loading or creating a title screen, the rest of the procedure is simply filling in the blanks on a menu-driven screen. Each protected disk is given a serial number along with any owner information you desire. After filling in this information along with your choice for the drives for the source and target disks, protected copies with consecutive serial numbers are cranked out as quick as a normal backup procedure. If the target disk is not formatted *Piratector* will format it for you. The target disks load and autostart by a *LOADM"FILENAME"*.

Does It Work?

We tried all of the disk-copying utilities at our disposal and none would break the protection scheme used in *Piratector*. I don't know, and don't want to know, how it is done, but it is far superior to any protection scheme on the market today. I guess the price of the program is a little steep, but so is the cost of writing good software. If you're serious about marketing CoCo software, this is an excellent investment.

One interesting note of caution. After ordering *Piratector* you will have to register your copy and obtain information on a validation file for your disk. The program will work as delivered but an extra beep will be present on all target copies until the validation file is added to your disk. One other thing I noticed in the "fine print" is the agreement that *Piratector* can be used for only 500 copies per year without seeking an additional royalty agreement with Sugar Software. It always pays to read the fine print.

(Sugar Software, 2153 Leah Lane, Reynoldsburg, OH 43068, disk $99.95)

— Dan Downard

Hint . . .

A Brighter Look

I have found that forcing the color set select signal high switches the video display generator to the opposite color set. That color set gives a brighter display on my monitor. To find out if this would be of benefit to you, try the following program:

```
10 POKE 65314,11
20 GOTO 10
```

Run the program and you should see an improved display.

To make a permanent change pull the video display generator chip. Bend pin 39 on the chip up so that it won't go back in the chip socket. Pin 39 is the color set select signal. Add a wire from pin 17 on the chip to pin 39 on the chip. This is +5V which holds the color set select signal high. Reinstall the chip in the socket.

Jim Rice

New Advantages Possible With *Disk VIDTEX*

You may remember that the first terminal program for the CoCo was *Videotex* from Radio Shack. It was designed for use with CompuServe's then-new information service. CompuServe worked out a "protocol" for screen formatting and low-resolution graphics based on what the CoCo was capable of. There have been a number of other terminal programs for the CoCo, many of which had some of *Videotex's* special capabilities. The present version of *Videotex* can download and upload cassette files to and from CompuServe using the "B" protocol, which provides full error checking, and all versions display medium-resolution graphics. CompuServe has been releasing greatly expanded versions of the *Videotex* programs for various computers; Radio Shack carries versions for the Model I/III, 4 and 2000, which they call *Videotex Plus*. CompuServe markets a similar CoCo program called *Disk VIDTEX*.

Disk VIDTEX doesn't have a Hi-Res text display, like some other terminal programs do. It does have lowercase displayed as reversed characters, and should work with lowercase boards such as the Green Mountain Micro Lowerkit. You can select either black letters on green or green on black. All of the *Videotex* features, especially designed for CompuServe operation, still apply, including the Lo-Res color graphics and downloading. Downloading in this case is to disk; when you ask to download a file, CompuServe checks to see what terminal program you're using and then asks for a filename. The terminal program and the host computer interact to transfer the file, check for errors and save it to your disk while you go put out the cat or whatever. Uploads work the same way.

The big advantage of *Disk VIDTEX* is its vast array of new features such as automatic logon, buffer storage of incoming text, function keys and an array of other goodies. There are 22 special features that are accessed by pressing the up arrow and a letter. Pressing up arrow and 'M' gives you a set of three menus for the various functions.

Updates to *Disk VIDTEX* are handled on the CompuServe system by downloading the new version to you; the system will also tell you if you already have the current version.

Aside from built-in lowercase, *Disk VIDTEX* has everything I think a terminal program used with CompuServe should have. For bulletin boards and other such things, I prefer other general purpose terminal programs, but I use *Disk VIDTEX* every time I logon CompuServe.

(CompuServe, 5000 Arlington Centre Blvd., Columbus, OH 43220, $39.95)

— Ed Ellers

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Upgrade Your DOS With *Full Screen Editor*

Looking through this issue of RAINBOW, it becomes obvious that there are utilities currently available to assist you in nearly any task you can imagine. My wife will swear that I own one of each . . . she exaggerates! Nevertheless, I will admit to having many utilities of which the most valuable is a full screen editor. If you have never used this type of editor before, you cannot possibly imagine what you are missing. Having just recently upgraded to disk, I was very pleased to receive DSL's new disk-oriented *Full Screen Editor* to review.

The machine language program is two disk versions, a 16-32K and a 64K version. Also included are four pages of instructions and a very well done HELP program that, when run, actually walks you through the various options demonstrating very clearly how the editor works. The 16-32K version is divided into several smaller programs to conserve memory and, therefore, uses between a minimum of 2066 bytes and a maximum of 3787 bytes. The 64K version is the better choice since it loads all ROM plus itself into the upper 32K, thereby using none of your valuable RAM.

For those who are not familiar with a full screen editor, I'll briefly outline the options. With the editor you have the ability to move the cursor anywhere on the screen using the four arrow keys. This means you can list several lines of a program and then simply move the cursor to the line requiring a change and type over existing characters, delete characters or insert new characters. There are no complex editing commands to remember, just use the arrow keys. In addition, the SHIFT left-arrow deletes characters and the SHIFT right-arrow inserts blanks. Many other possibilities also become apparent as you learn the ropes. For instance, suppose you want to move a line form one spot in a program to another. Simply list the line, move the cursor over the line number, type the new line number and ENTER. Now just delete the original line and you are done.

Full Screen Editor, however, does more than just edit. First, there is an automatic line numbering command where you enter the starting line and the increment, and whenever you press ENTER the editor responds with the next line number. This is a must for your own programming efforts and can make entering most programs much easier. Next, a new form of the *LIST* command has been added which allows you to scroll through a BASIC program, forward and backward, using the arrow keys. (It temporarily turns off the full screen editor.) Also, a new form of the *DIR* command is included that displays programs on disk a screen full at a time and prefixes each program with *LOAD* or *LOADM*. Using the arrow keys you then move to the program to be loaded and press ENTER. The new *DIR* command also allows you to enter a single letter upon which only those files beginning with that letter will be displayed.

Finally, DSL has included a search and change command. This command has several options allowing you to search a BASIC program for any combination of characters and returns the line numbers of any matches. It also allows you to search and change anything in the program. It can even prompt you prior to each change. For instance, if your CoCo will not accept the *POKE 65495,0* (high-speed poke), you can simply change all occurrences of 65495 to 65494, thereby disabling the high-speed poke.

Overall, this is an extremely well-written program. If you already own a full screen editor, you'll have to decide whether the extra options make it worth the cost. If you don't own a full screen editor, take my advice and get one. There are several available and DSL's certainly ranks among the best. One final note for those of you who have chosen "the" alternate operating system, JDOS. Have no fear, based on my testing, *Full Screen Editor* appears compatible.

(DSL Computer Products, Inc., P.O. Box 1176, Dearborn, MI 48121, disk $19.95)

— Ken Boyle

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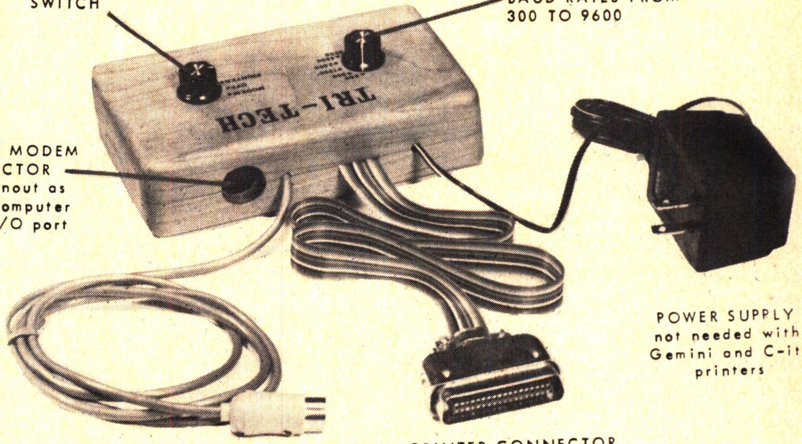
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Software Review

Mr. Dig Keeps You Picking And Grinning

Last weekend I visited my CoCo farm to pick some luscious, ripe cherries. I walked along each grove picking cherries and humming my favorite tune ("Somebody's Watching Me"), occasionally passing some apple trees. As I was halfway down a cherry grove I felt that eerie, paranoid feeling each of us has had at least once in our lives, someone or something — was behind me. I quickly turned and there was a creature with a blue head and tan body running full-speed toward me. It was "the Meanie," a vicious little monster who loves to eat cherry pickers more than cherries. In haste, I made a sharp right turn in front of an apple tree, shaking the leaves as I passed, and an apple fell, landing on the pursuing Meanie's head. It squashed him. I, Mr. Dig, fought another battle against the nasty gang of cherry grove pests who make my cherry-picking life miserable . . . and dangerous.

Mr. Dig is a fun, strategic game requiring 32K, one joystick and one player, and is available on disk or tape. After loading this assembly language program, the word "blue" will fill the screen. Press the Reset button until the words are colored blue. Then, after pressing the fire button on your joystick, you will be greeted with a colorful graphics page showing Mr. Dig (a cute little character who looks like he's wearing a stocking cap and holding a shovel in his hand). When you press the fire button again you will see another graphics screen asking you to pick a skill level (simple, hard or "no way"). You do this by moving your joystick to the desired level and pressing the fire button. Next, the screen will display the nasty cherry grove pests you'll be encountering: Meanies, described above; Miners, big mouths with white, sharp teeth; Mallers, faces with large white eyes and mouths; and Letter Monsters, creatures with fat stomachs displaying any letter in the word "extra" on their tummy.

Using the right joystick, Mr. Dig, who starts at the bottom center of the screen, may be maneuvered around the CoCo farm clearing tunnels and cherry groves in his path. The object of *Mr. Dig* is to eat all the cherries and accumulate as many points as possible while avoiding the nasty avengers whose sole purpose is to eat Mr. Dig. To pick a cherry, move Mr. Dig over the top of it. Each eaten cherry is worth 50 points, and if Mr. Dig eats eight cherries without stopping, you are awarded 500 points.

Along the journey you will encounter apples which you may use to kill (or squash) the pursuing creatures. There are two ways to drop the apples on their heads: dig the ground underneath the apple by running under it so it will fall, or push the apple (left or right) until it falls down a vertical tunnel. However, an apple won't fall until Mr. Dig backs away from it. Try to hit as many Meanies as you can with a single apple because you will accumulate more points. For instance, the first squashed Meanie is worth 1,000 points; any additional Meanie is 2,000 points. Sometimes after an apple falls and cracks open, a diamond will appear. If you get it, you will receive 10,000 points and be moved to the next screen.

The sound is very good and adequately depicts each play in the game. For example, when a Meanie is hit by an apple a 'squashing' sound is heard. When Mr. Dig dies or it's the end of the game, a melody implying doom resounds. But when Mr. Dig clears a screen or gets enough points that he goes to the next screen, a pleasant melody is heard.

Another way to kill your pursuers is to throw a Power Orb at one by pressing your fire button on the joystick. Be careful, though, after you've thrown a Power Orb it takes a short while to throw another one, so steer away from the nasties, especially during this time.

When all the Meanies have left the screen, there will be a "treat," which resembles a pound sign, in the middle of the screen. If Mr. Dig runs over it, a beeping noise will resound along with a bright flash of the screen and all the new Meanies will freeze. Three Mallers will appear with a Letter Monster. If you hit this creature with your Power Orb or an apple, you will light up the letter located on its belly. If you light up all the letters in the word "extra," you will be awarded an extra Mr. Dig.

Every time a Meanie, Miner, Maller, or Letter Monster touches Mr. Dig, he dies. Keep a close eye on the Meanies because they will mutate and become Miners who can dig the ground from under Mr. Dig, also causing his death. Mr. Dig has four lives in a game. During each game, in the upper-right corner of the screen, your score is displayed along with the highest score located above it. The word "extra" is also displayed in the top middle of the screen, with the highlighted letters you have Power Orbed.

The documentation is good and accurate except in the beginning paragraph. It tells you to *LOADM"MRDIG* if you are loading from disk. This does not work; you must *LOADM"MR-DIG*. Other than this small error, the documentation is more than enough to supply you with adequate information to play the game. As in any game, the best way to get the most points is to practice (which the documentation reminds us). Through repeated plays you will see the best strategies for you (whether eating cherries and pushing apples is your defense, or throwing Power Orbs at Letters Monsters).

Overall, *Mr. Dig* is a very good, fun game with excellent use of graphics and sound. Perfecting strategies and just playing for fun will keep you on your CoCo farm for hours . . . even days. Just watch out for nights, that nasty gang of cherry grove pests are harder to find in the dark.

(Computerware, Box 668, Encinitas, CA 92024, 32K non-ECB, tape $27.95, disk $30.95)

— Susan Remini

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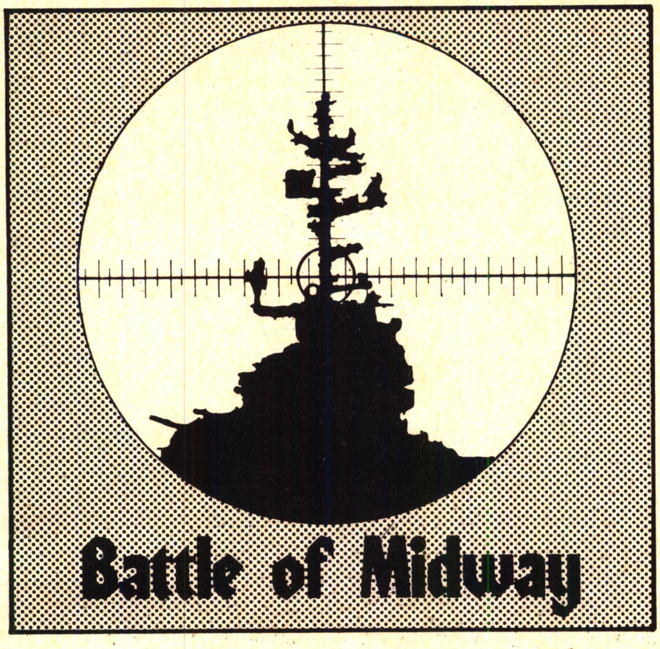

CINC PAC — Battle of Midway 32K

Ark Royal's masterpiece game of naval strategy of perhaps the most important battle in the history of the United States Navy. Hi Res graphics, 75% machine language allows player to control as many as 41 separate units on the screen at one time. Command Task Forces 16 & 17 as they play cat and mouse with the Japanese fleet. Maneuver the Hornet, Yorktown and Enterprise into the best position. Set courses and launch search and attack aircraft then hope for the best. Find the enemy fleet, then pick the targets: Akagi, Soryu, Kaga, Yamato and others in this historically accurate game. Relive history, Admiral, and it won't be any easier this time around. Anchors Aweigh.

Game save. Requires disk version to operate on disk. Cassette $27.95.

COMPANY COMMANDER

COMPANY COMMANDER 32K

Game module 1 — **House to House.** Ark Royal's squad level WWII infantry combat game.

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Choose campaign play and put yourself on the battlefield, Corporal Smith or Jones; collect points toward promotion. Order up smoke from the mortar squad, HE for those dug in units. Take the objective and you might make Major someday. Just don't step on a land mine.

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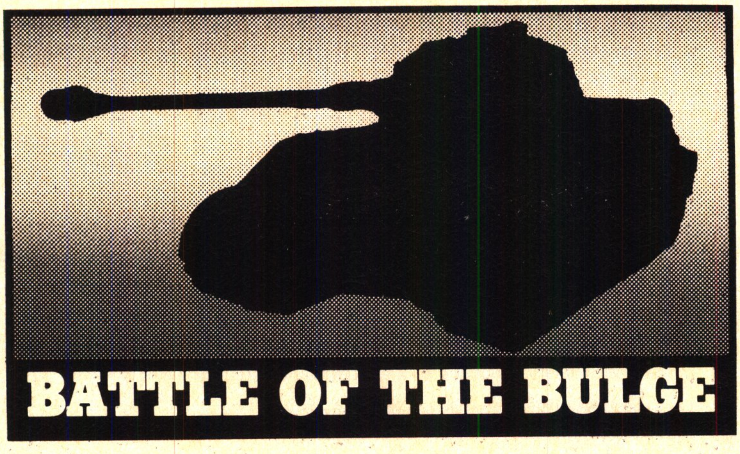

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Ark Royal's 1 or 2 player game by the author of Battle For Tunis, Bulge recreates operation **Wacht Am Rhein,** Hitler's last desperate gamble of WWII. In none of our games is the fog of war so apparent than in BULGE. You know the Germans have attacked in the Ardennes, but little else. What is their strength? Their objective? Who do you send to repair the huge gap in the American lines? What bridges do you blow? Can you protect the fuel depots? Where are all those Tigers coming from? When will the weather clear?

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Software Review

Easy-File Is a Good Data Management System

Easy-File is one program that lives up to its name. In fact, *Easy-File* is so simple to use that the last thing you should do is read the instructions.

I'm one of those people who gets a new toy or Jungle Gym and immediately goes to work putting the project together. Instructions are to refer to only if you get confused. For some reason, I decided to read every word of the instructions before working *Easy-File* — a big mistake.

Easy-File comes professionally packaged in a loose-leaf notebook, it's typeset, easy to read, well-indexed and written as a tutorial. It is probably one of the best looking packages I have yet seen for CoCo software. But by the time I finished reading the tutorial, I was almost afraid to *RUN"EASY FILE"* — it sounded all so complicated with eight individual programs and numerous special alternates and options.

I was pleasantly surprised when I turned on the machine and got started. This computer file could almost work itself —it is that easy to use. It prompts you for everything it needs to do the job for you.

At first, you are asked to tell it how many disk drives you will be operating. Next it wants to know what day it is. Then it is menu time, and what you get is the full course menu. It is also at about this point that you realize your familiar uppercase type with reversed colors to indicate capital letters have been replaced with a true upper-/lowercase typeset that is harder to read. It's Mark Data's SUPER SCREEN which comes with *Easy-File*. It does make the on-screen information look better, so I guess I could get accustomed to it, even learn to like it.

When you select one of the options, your disk drive starts and replaces the *FILES.BAS* program with one of the other seven programs on the disk. This limits the amount of memory required for the working program and switching from one program to another is quick and easy.

Even creating new disk files is simple. *Easy-File* asks for everything it needs to set up the file. For those of us who got involved in the earliest data management systems for our 4K, 16K, 32K then 64K machines, we got used to limiting every file to eight fields. *Easy-File* allows 30 fields per record. Each field is designated either (A)lphanumeric, (N)umeric or (D)ollar. Numeric fields can be added and Dollar fields are formatted automatically.

You also have the option to make certain fields unavailable to the keyboard operator so that someone could not get into your file and change data. That, along with the option to include a password, gives the owner some extra security for their files.

Fields with "NAME" in them are specially treated. All name fields are entered last name, first name, middle initial — it can be printed in that manner or reversed to give you first name, middle initial, last name. "DATE" fields also get special treatment — they are automatically formatted MM/DD/YY and require six characters. That's nice, but it will cause problems for genealogists like myself who need a MM/DD/YYYY format (I wish there were some way that I could override the automatic format if required).

There are so many features to this program I cannot begin to list them all and most people probably could never use them all — but it is lean and quick (with the possible exception of the *SORT.BAS* program which takes quite a bit of time to read and sort each directly entered file, then creates an index for future use).

Printing reports is also easy. The printing routines are set up for Okidata printers and should operate on most others without change — but if a change is needed, complete instructions are included in the appendix. The various report options make some good-looking reports with the information you want included, in the order you want it and without things you don't want. Of all of the files programs I have seen, this one is the easiest to set up and the most flexible.

And now the bad news. For some reason *Easy-File* thinks that my paper is 63 lines long when it is 66 lines long. My reports came out three lines short per page, which means my work doesn't start at the top of each page. I feel certain that the wizards at Mark Data have a solution to this and I intend to ask them (when I ask about the date format). With these enhancements, there is no question that I will buy *Easy-File* for my personal software library.

I would, however, offer one bit of advice to Mark Data —simplify the instructions. We reviewers generally criticize software for a dearth of documentation but in this case, it could be done in half the words. *Easy-File* is so easy it virtually speaks for itself.

(Mark Data Products, 24001 Alicia Parkway, #207, Mission Viejo, CA 92691, 32K, disk $59.95)

— Glenn B. Knight

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Learning Games — A Three-Program 'Classroom'

Learning Games is an educational package containing three programs which teaches youngsters to discriminate shapes, recognize and spell simple words, and count objects.

Learning Games comes on tape and, according to the author, is appropriate for ages three to eight. The age range may be valid, but each game is not appropriate for the entire age span. The games are in the form of a drill and practice session, with the game's contents remaining the same and the child scoring on his/her performance each time.

Let's look at each game separately to see which ones might appeal to your child and are appropriate to his skill level. All three games use vocal instructions and prompts within the program, with the first two games requiring the use of joysticks. System requirements call for a minimum of 16K with Extended BASIC.

Game one is called *Shapetest*. After the program is loaded and you are treated to a brief musical interlude, the program begins by introducing the shapes which will be used in the drill portion of the game. Remembering the age range three to eight, consider the shapes introduced: square, circle, elipse, rectangle, triangle, hexagon, octagon, parallelogram, and trapezoid. All 10 shapes are introduced before the drill begins. Right here is where I find something amiss. The circle is not round (it is a fat ellipse). And the vertical sides on the square are longer than the horizontal sides (it is, in fact, a rectangle). It's true that the shapes are usually distinct enough that a child will probably be able to learn which ellipse the computer wants him to call a circle, and which rectangle is supposedly a square, but the program, in essence, is teaching an incorrect answer.

In the revised program documentation, the author suggests that the distortion in circles and squares may be eliminated by adjusting the horizontal width and vertical height controls on the TV. Check your TV before assuming you can do this. Two of my three televisions do not provide for consumer adjustment of these functions.

In the drill, three shapes appear on the screen and the voice on the recorder asks the child to move the blinking cursor with the joystick to the stated shape and then push the button. If the child is correct, the program rewards him/her with a randomly selected colorful, whimsical picture, accompanied by sounds or music. An incorrect response elicits a different sound. The four-year-old who played the game for me enjoyed the "incorrect" sound so much he would keep his finger on the button for at least three or four repetitions of the buzzer, but he was not at all computer sophisticated and I suspect this phenomenon would wear off quickly. After presentation of the shapes for identification, the program then uses the shapes to test for color recognition, again presenting three choices and asking for a joystick response.

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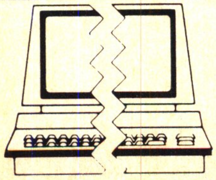

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The second game is a *Wordtest* that follows a format similar to the shapes test. After the child picks the correct spelling, he must remember it because the screen goes blank and he is asked to spell the word using the keyboard. Again, consider the ages of your children when reviewing the word list, realizing that the child must not only recognize, but also spell the correct answer. The 10 words are: cat, dog, man, car (pronounced "caaa" by the voice on the recorder with the distinct eastern accent), toy, boy, bird, girl, tree, and ball. The reward comes both after identifying the correct word, and after spelling it correctly. The child is given two chances to spell the word before the computer displays the proper spelling and moves on to another word.

Several times when I ran this program something happened — an error message appeared on the screen, or worse, the tape somehow got out of synchronization and the voice was asking the child to spell and identify a different word than the program was rewarding as correct. The intermittent nature of the problem precluded determining if this is a tape or equipment problem. This kind of error is very disconcerting to a young child. It was also disconcerting to me because the program must be started over. It's wise to record the approximate start position of the tape for each of the three programs. It's a credit to the author that this last type of problem does not occur more often, considering how many times the programs turn the recorder off and on for verbal instructions.

The third program is a *Count* test in which "magic beeping marbles" are dropped into a jar and the player is asked to record the number on the keyboard. The numbers range from one to 12. Again, for each correct answer the computer selects one of its reward picture /sound combinations to entertain the child. Incorrect answers are "buzzed." The player's marble count may not be entered until an okay sound is given. When I played the game I found the delay between the last marble falling into the jar and the go-ahead sound (to make my guess), too long. I frequently jumped the gun and the computer refused to recognize my response. I had to re-enter it. Figuring I was an adult and kids wouldn't be as fast, I watched carefully. Sure enough, when the kids knew the answer without counting, they did the same thing.

The instructions for the program are complete, the rewards colorful and reasonably interesting to the children for whom they were designed, and the concepts valid ones. Each program graphically scores the child's performance and gives a verbal reinforcement. The games do have their flaws. Only the buyer can answer the question of whether *Learning Games* suit his needs.

(DD Software, 10 Simonne Lane, Pepperell, MA 01463, 16K tape, $24.95)

— Marty Sheldon

Good Guys And Bat Guys With *Fangman*

Most of us have seen Dracula die at least a dozen times in the late movies, but his departure is never permanent. He's back again in *Fangman*, an innovative creation of Tom Mix Software, but in a different role.

This time Dracula is the good guy! And since we're also good guys, we've got to help Dracula escape from the angry villagers who seek to do him harm.

They are like flies as they invade your castle, seemingly everywhere, seeking to destroy you by blocking your path with deadly crosses. The sun is their ally, wandering about the halls in a continuing effort to turn you into bones and dust.

Fortunately, you have allies of your own, the vampire bats that chase down the villagers and trap them until you arrive.

There are four levels of difficulty, ranging from 'Sucker' to 'I-V Leaguer'. The game is played in rounds, with a new screen for each round.

There also, for the English majors, are some of the best puns I've seen in a while to break up the monotony between screen changes. How about 'Fangs for the Memories,' 'Coffin Klatch,' 'Good Guys and Bat Guys,' and 'Little Brown Jugular'?

As with most of Tom Mix's games, the graphics and sound are good, the action continuous, and the level of challenge is consistently high. But the challenge is reasonable, and the more you play, the better you get — and the more fun you have.

You start the game with three lives, the number of which are shown at the lower left-hand part of the screen. If you turn all the villagers into bats before the bonus clock runs out, three things happen: You receive an extra life (up to 16 are possible), the number of points left on the clock are added to your score, and the number of villagers in the next round is increased by one. The more villagers there are, the longer the clock runs. The game ends when you run out of lives, of course.

A time-out feature is activated by pressing the 'T' key, freezing the characters. To unfreeze the action, just press the 'U' key. The high score is displayed constantly at the top of the screen, along with your current point total.

You have to be constantly alert while chasing the villagers because if they cross paths, they leave deadly crosses. I learned through experimentation that if you press your joystick button and wiggle the toggle switch around, Dracula will reverse in color and will be able to eliminate three of the crosses. This gives you many more chances to escape if the sun is bearing down on you.

When a villager is eliminated, he is transformed into a bat. When bats cross paths, coffins are created in the hallways. This is good news for you, Dracula, because they're worth 25 points each.

For the sheer fun of computer games, it would be difficult to match *Fangman*, although relatively few might offer better graphics and sound. On a contagious scale from one to 10, I would give *Fangman* a nine. This is one game that you will enjoy playing often.

(Tom Mix Software, 4285 Bradford N.E., Grand Rapids, MI. 49506, tape $24.95, disk $27.95.)

— Charles Springer

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omers now will get big brakes later!

Color Stronghold — An Interesting Game Of Survival

It is always intriguing to attempt to figure out why and how a game was developed, as well as the more technical questions that come to mind as you play. The authors of *Color Stronghold* have come up with a neat way to attract your attention and "win you over" even before you play the game. The disk version of the game that is the subject of this review (it is also available on cassette) comes packaged in shrink wrap with a colorful picture of a "future man" holding a shield to defend his city from an onslaught of fiery meteors from outer space. On the other side of this picture are greetings from Larry Chow and Ken Olson, the game's authors. They tell you a little about themselves and how they came to develop the game. A strong clue to the game's strategy is provided when you are told that Larry is a war gamer. While Ken is an experienced assembly language programmer, *Color Stronghold* is Larry's first effort. The game was originally written for the Model I/III/4 and then converted for the 32K CoCo. The disk itself is supplied in a colorful vinyl sleeve.

The game's premise is that a war almost destroyed civilization. The handful of survivors set up four colonies and shielded themselves from the radioactive debris that is still bombarding the earth. They have built a shield for each colony that acts as a "mobile energy catapault" that repels the debris.

Color Stronghold may be played with the arrow keys or joysticks. The number of players (two may play) is requested after loading the game. To use the joysticks for one player, the fire button on the right joystick is pushed; for two players to use the joysticks, the fire button on the left joystick is pushed; to use the arrows, either a '1' or '2' on the keyboard is pressed. You are then immediately confronted with the game action. The four corners of the screen each contain a city skyline (each one is different) that is surrounded with three walls of solid material. A saucer-shaped shield is positioned on the outside of each of the outer walls of the cities. If you selected a one-player mode, then you control the shield on the lower right-hand corner of the screen. The other three cities are defended by the computer. In a two-player game, the second player controls the shield for the city in the lower left-hand corner. The remaining two cities in a two-player game are defended by the computer. Both of the cities on the bottom of the screen have a box in them that keeps the player's score. There are two "balls" bouncing randomly around the screen that destroy small portions of any wall that they hit. The player moves the shield so as to deflect the balls before they hit one of the walls protecting the city. You score 10 points for each block of an opponent's wall that is destroyed. One may simply play defense and try to deflect the balls, or one may get into the game and catch the ball (this is done by holding down the fire button on the joystick as the ball hits the shield, or by holding the "/" down on the keyboard as the ball hits the shield) and attempt to destroy an opponent's city by "throwing" (releasing the fire button or the "/") the ball at the target. Throwing takes some getting used to because the ball goes in different directions depending upon where you are when you release it. Once all three layers of a city's walls have been penetrated by the balls, a direct hit on one of the city's buildings by a ball will destroy the entire city, thus destroying you and all of its inhabitants. You are returned to the beginning screen where your score and the top score are recorded and you are requested to indicate whether one or two will play the next game. In a two-player game, the second player continues until defeated or until the computer's two cities are destroyed.

If the computer's three cities (one-player game) or two cities (two-player game) are destroyed, then the game moves on to the next level of play. If you were destroyed in a one-player game but the other player destroys both of the computer's cities, then you also get to play again as the game moves on to the next level. Your city and its walls are restored for the next level of play. The degree of difficulty and the interest level are increased as you go from one level to the next. The second level introduces a dragon that periodically moves across the screen between the upper and lower cities. He is destroyed by a direct hit by a ball and the source of the ball is awarded with extra points. A moving angle iron with a revolving cartwheel appears at the third level. The angle iron may be likened to the lower half of a "T" with one half of the top missing (a 90 degree angle). At the point where the bottom line intersects the top line of the angle iron, a revolving cartwheel (envision an "X" going around in a circle) catches a ball periodically and throws it randomly. The benefit of the angle iron is that it protects your city while it is moving over it and gives you a chance to rest. Speaking of resting, the game may be paused at any time by pressing the 'P' on the keyboard. When I say pause, that's as in "freeze." A ball that is on the way to hitting something just stops in midair. ENTER gets you going again. I wish I could tell you what neat things lay in store for those who get by the third level but my humility (and general lack of eye-hand coordination) doesn't allow me to discuss that.

If you want to end the game you are playing so that you can play with another person, you may abort the game by pressing the BREAK and CLEAR key at the same time. You are returned to the beginning screen where you select a two-player game.

The graphics employed in the game are extremely good. Blue, orange, white and black are used to make a very impressive playing field. The detail used in designing each city is obvious. Sound is used to give the atmosphere of arcade style action. Beeps and bongs are used to indicate hits of the ball by the shields and the balls on the cities' walls. The destruction of a city, the transition to the next level and the end of the game are each accompanied by an appropriate refrain. The degree of difficulty is about right — it's not so easy that you get bored and it's not so hard that you get frustrated. My 13-year-old daughter enjoys the game and will sit for long periods of time playing it.

The documentation consists of one 8½ x 11-inch page that gives briefly all of the information that is needed to play the game.

My daughter says that she enjoys *Color Stronghold* and that she would spend her own money to buy it. Her endorsement means more than mine, but for what it is worth, I also recommend it.

(MichTron, 576 S. Telegraph Road, Pontiac, MI 48053, $27.95 tape, $29.95 disk)

— A. Buddy Hogan

Hardware Review

Hayes Mach II Joystick Is A First-Class Performer

Hayes Products is now selling a really good joystick for the CoCo and other computers; it's the best one I've seen yet.

The Hayes Mach II uses a joystick mechanism not unlike the ones used in the transmitters for radio-controlled model planes and boats. It can be set up either for return-to-center operation (which many games, written for use with Atari-type joysticks, respond to best) or the non-return operation that the low-cost Radio Shack sticks use. You can even set up both sides of each axis for return, non-return or even lock one or more sides (a feature not covered in the instructions). There are two trimmer adjustments on top of the unit to set up the center position, compensating both for variations in the joystick and in the computer. There is one trigger button, placed so that your thumb lands on it when you hold the base in your left hand. (Left-handers may have some trouble with this stick.) There's a square space showing where a second button might be; the Apple and IBM versions have two buttons.

The Mach II has the best feel of any CoCo joystick I've seen. The stick moves easily, with a spring action (when used) that doesn't hinder movement. The button works well, also. The joystick is also very durable, and should hold up under even the toughest use. Overall, the Hayes Mach II is as good a value as any CoCo joystick.

(Spectrum Projects, Box 21272, Woodhaven, NY 11421 or Box 9866, San Jose, CA 95157-0866, $39.95 plus $3 S/H; manufactured by Hayes Projects, 1558 Osage Street, San Marcos, CA 92069)

— Ed Ellers

CORRECTIONS

"Cooking With CoCo" Colin Stearman tells us that there is a problem with the schematic diagram for the EPROM programmer shown on Page 74 of the September issue. On the three 2764 EPROMs U4, U5 and U6 (U6 is actually the programming socket), data lines D0 through D7 are shown in reverse order. Here are the correct pin numbers:

D0 — 11
D1 — 12
D2 — 13
D3 — 15
D4 — 16
D5 — 17
D6 — 18
D7 — 19

Also, the +5 volt and ground (shown as 0V) lines on the two 6821 PIA chips are reversed; +5V should go to pin 20 and 0V to pin 1. Please note that all of the pins are marked with their function, *not* with the pin number. The chips are shown with the pins arranged as they are on the actual part; pin 1 is on the lower right (marked with a dot). This accounts for some of the wiring crossovers in the diagram.

There has also been some confusion over the listing in Part 3 on Page 79 of the September issue. A portion of the program drives a parallel interface which will be described in the December issue. Until this is built, you will need to delete Lines 466 through 470 and Lines 574 through 634. The programs on RAINBOW ON TAPE for October and November reflect these changes.

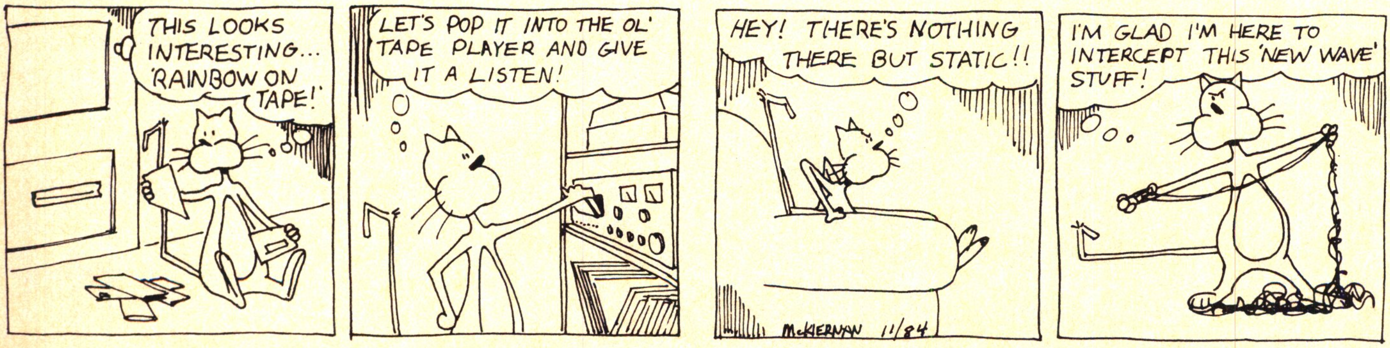
"The Jungle" (August, Page 18), there is a problem with keyboard response when using the new ROM (Color BASIC 1.2; do an *EXEC 41175* to see which one you have). Robert T. Rogers suggests adding one line to the program:

```
140 POKE 341,255:POKE 342,255:POKE
343,255:POKE 344,255
```

"Sopwith CoCo Flies Again" (August, Page 75), William G. Franklin tells us that there is a problem with errors in the course select read outs when using the 32K version. To fix this, change the correction factors shown in Line 1740 to add an extra digit of precision; .5729 becomes .57296, 5.729 becomes 5.7296 and 57.29 becomes 57.296.

"The Dragon's Gold" (August, Page 25), Charles Husak recommends that the number 254 in Lines 270 and 2850 be changed to 126.

CoCo Cat


THIS LOOKS INTERESTING... 'RAINBOW ON TAPE!'
LET'S POP IT INTO THE OL' TAPE PLAYER AND GIVE IT A LISTEN!
HEY! THERE'S NOTHING THERE BUT STATIC!!
I'M GLAD I'M HERE TO INTERCEPT THIS 'NEW WAVE' STUFF!
McKIERNAN 11/84

DISK TUTORIAL

32K Disk

The fifth of a six-part series.

Developing A Database Manager

By Bill Nolan
Rainbow Contributing Editor

As those of you who have been following this series know, we have been exploring direct access disk files and their use in a simple database manager program. We have been writing a mailing list program in this column that's as good as some commercial mailing list programs. So far, we have presented all of the program except the search and sort portions, and we will be adding the search in this column.

The program is written in a very modular style, with the various modules selected from a menu, or list of choices. When a program is written this way, you can test each subsection as though it were a small program by itself, and this makes program development proceed much more rapidly and smoothly. This is the reason you have been able to use the program to type in names and addresses, and then print these names and addresses on labels or in a phone number list even though two major parts of the program are not yet included. As long as you avoided selecting search or sort on the menu, you were OK.

Before we get into the search section, we need to talk about *PCLEAR* for a moment. Line 10 of our program has a *GOTO 11000* in it, and Line 11000 is *PCLEAR1:GOTO 20*. The *PCLEAR* statement tells the computer how many pages of graphics memory we are going to use. Each page of graphics memory uses about 1500 bytes of space, and since we won't be using any graphics memory, we want as few pages of graphics space cleared as possible. Your computer automatically clears four pages when you turn it on. Since we don't want four pages, we do a *PCLEAR1*. We would do a *PCLEAR0* if the computer allowed it, but that is not a legal command in BASIC.

If you have been running other programs in your computer, particularly those that use graphics, you may get an Illegal Function Call Error in 11000 when you run this program. The reason for this is that you cannot do a *PCLEAR1* if you are in a *PMODE* that requires more than one page of graphics space. If this happens to you, just type *PMODE0* and *RUN* the program again. If the problem persists, you may have a version of the ROM that is giving the problem. In this event, just type *PCLEAR1* before running the program.

Now, on to the search section of our program. Searching is the process of going through a file looking for all of the records that contain certain things. For instance, you may want to find all of the people named Jones, or all of the people living in Ohio, or all of the people with a particular telephone prefix. The item you are searching for is called the target, and when you find the target in one of your records, that's called a match.

In our program, the search section is located starting at Line 3000 and continuing through 3550. This leaves the block of lines starting at 2000 open, and it is here that our sort section will go when it is added next month.

Line 3000 sets our flag to off (more later), clears the screen, and finds out if the user wants the matches on the screen or on labels. Line 3010 then prints a warning about the printer. (If I don't go over a particular subroutine, that means I have already done so in an earlier installment of this series.) Line 3020 finds out on which field the sort will be done (using the subroutine at 6500 that prints out all the field names). Remember, each piece of information, such as a name, an address, or a ZIP code, is a

(Bill Nolan, who teaches "Programming In BASIC" at the college level, owns Prickly-Pear Software Co. and has written several commercially successful software packages.)

field, and all of the information about one person is a record. All of the records together are a file.

Line 3030 finds out what the user is looking for (the target), and Line 3040 makes a branch to 3500 if they want the output on printer labels. If they didn't want the output on labels, the program will just go on to Line 3100. We actually have two different sorts then — one with the results going automatically onto labels (located at 3500 - 3550), and one with the results to the screen (located at 3100 to 3320). We will look at the shorter one (3500) first.

Line 3500 clears the screen, prints the message, "searching . . .," and executes the subroutine at 5500 to open the file. Line 3510 establishes a *FOR. . .NEXT* loop from one to the highest numbered record in our file. The *GET#* command will then get each record from the disk , put the information into an array in the subroutine at 7200, and then, in Line 3520, compare the proper item in the array to the target that was entered by the user. In doing the comparison, the *INSTR* function is used, so if the target is anywhere in the field we are searching, a match will occur. For example, a target of "Jo" will find both "Jones, Fred," and "Smith, John," because the target of capital "J" and lowercase "o" is found in both "Jones" and "John." (Watch out for upper- and lowercase letters — the computer thinks they are two different letters.)

If a match is found then the subroutine at 5000 will be used to print a label. This subroutine also sets our flag "FL=1" to on. Whether a match is found or not, Line 3530 completes the *FOR. . .NEXT* loop with a *NEXT X* (to check the next record), and when all records have been checked it closes the file. Line 3540 checks the condition of the variable FL. If this is equal to zero then we know that the program has not been to Line 5000, and since we do a *GOSUB 5000* whenever a match is found, this tells us that no matches were found and we print a message to that effect on the screen. In either case (matches found or matches not found), Line 3550 returns us to the main menu at Line 500.

As you can see, using this section of the program the output to the printer label is automatic, and the action is continuous until the entire file has been checked. As you will see in a moment, the section beginning at Line 3100 gives us more choices, but is not so automatic.

Line 3100 clears the screen and does a *GOSUB 5500* to open the file. Line 3110 sets up our searching loop, gets the first record, and does a *GOSUB 7200* to put the information into an array. Line 3120 does the comparison of the proper field to the target, and if no match is found it branches to 3200 where it does a *NEXT X* and checks the next record. When all records have been checked, Line 3200 closes the file, Line 3210 checks the condition of our flag variable "FL" and prints our no matches found message if appropriate, and Line 3220 returns us to the main menu at Line 500. So far, this is just about like the section we just talked about at Line 3500. The difference begins if a match is found.

"We have seen commercial programs that literally take days to sort because of disk access time, and many take overnight. Our sort, although it is in BASIC, will take just a few minutes for a full file."

If a match occurs in Line 3120 then the program clears the screen and does a *GOSUB 5400*. At 5400 the flag is turned on (FL=1), and all six fields in the matched record are printed on the screen. Then, in Line 3130-3150, the user is given several choices. They may press 'P' to print this information on a label, press 'N' to go to the next item, press 'R' to return to the main menu at 500, press 'D' to delete this item, or press 'C' to make changes in this item. When the user presses one of these letters, Line 3160 will branch to the proper location to do what they have selected.

If they choose 'R', then it will *GOTO 3170* where the file is closed and a branch is made to the main menu at 500. If they choose 'P', then Line 3160 will do a *GOTO 3190*, and at 3190 we first branch to the subroutine at 5000 to print the label and then go back to 3120 to reprint the choices on the screen. Remember, the person may want to print this record, but then they may want to make one of the other choices. If they choose 'N', then 3160 will send them to Line 3195 where they will encounter first a short beep, and then a *NEXT X* to get the next record. If they choose 'D' to delete this record then Line 3160 will do a *GOTO 3180*. The routine at 3180 deletes the record by filling it with "up arrows." The reason for this will become apparent when we do our sort section next month. Since the record is deleted, no further choices apply, so at the end of the routine in Line 3180 we jump to 3200 and our *NEXT X*. The last choice the person had was to press 'C' and change the record. If they do this, Line 3160 will send them to a subroutine at Line 3300.

Line 3300 clears the screen, prints each field in the record with a number from one to six in front of it, and asks the user which piece of information they want to change. They will indicate their choice by pressing a key from one to six, and when they do that a message telling them which field they are changing will be printed on the screen (in Line 3310), and they will be asked to enter the new information. The *LINE INPUT* in Line 3320 accepts their new information, does a *GOSUB 7100* to *LSET* it, *PUTS* it on the disk, and goes back to Line 3120 where the list of choices will be presented again.

Well, that's about it for the search section. Our program is now complete except for the sort. The sort will have two functions. First, it will put the information in order by the field of your choice, so you will be able to have people in order by name, ZIP code, state, or however you choose. Second, it will compress the file by removing the deleted records completely. Our current delete leaves an empty record number. As we have been promising, you will like the sort. We have seen commercial programs that literally take days to sort because of disk access time, and many take overnight. Our sort, although it is in BASIC, will take just a few minutes for a full file. In fairness to the commercial programs, however, we must point out that it is the type of sort we are using that limits us to 400 records in a file, and if we allowed more records we would have to change our sort method.

Next month, in addition to the sort, we will have complete directions on how to operate this program. We have been giving these piecemeal, and so we will put them all in one place to make it a bit more convenient. Have a nice Thanksgiving.

560	100
1200	185
3140	159
3540	154
4220	43
5150	134
END	36

The listing:

```
10 CLS:GOTO 11000
20 CLEAR 15000
30 DIM ST$(400),ST(400),R$(6)
40 PRINT:PRINT" WORK ON WHICH FI
LE?":INPUT F$:GOSUB 5500:CLOSE #
1
50 IF LR<1 THEN PRINT:PRINT" THI
S IS A NEW FILE":PRINT:PLAY"AB":
GOSUB 7000
60 CLS:PRINT:PRINT"DO YOU WANT L
BELS PRINTED:":PRINT:PRINT" 1. L
AST NAME FIRST":PRINT" 2. FIRST
NAME FIRST":PRINT:PRINT"PLEASE S
ELECT 1 OR 2":K$=INKEY$
70 K$=INKEY$:LC=VAL(K$):IF LC<1
OR LC>2 THEN 70 ELSE SOUND 150,1
500 CLS
510 PRINT:PRINT"              MAIN
MENU":PRINT:PRINT"  1. ADD RECOR
DS"
520 PRINT:PRINT"  2. SORT RECORD
S"
530 PRINT:PRINT"  3. SEARCH RECO
RDS"
540 PRINT:PRINT"  4. PRINT RECOR
DS"
550 PRINT:PRINT"  5. END PROGRAM
"
560 PRINT:PRINT" PLEASE ENTER YO
UR CHOICE (1-5)":K$=INKEY$
570 K$=INKEY$:K=VAL(K$):IF K<1 O
R K>5 THEN 570 ELSE SOUND 150,1
580 ON K GOTO 1000,2000,3000,400
0,10000
1000 CLS:GOSUB 5500:CLOSE #1:CR=
LR+1:PRINT"  YOU ARE ADDING RECO
RD #";CR:PRINT"  TO THE FILE ";F
$
1010 PRINT:PRINT"NAME (LAST NAME
, FIRST NAME)?":LINE INPUT R$(1)
1020 PRINT:PRINT"ADDRESS?":LINE
INPUT R$(2)
1030 PRINT:INPUT"CITY?   ";R$(3)
1040 PRINT:INPUT"STATE CODE?   "
;R$(4)
1050 PRINT:INPUT"ZIP CODE?   ";R
$(5)
1060 PRINT:INPUT"PHONE #?   ";R$
(6)
1070 GOSUB 5500:GOSUB 7100:GOSUB
 7200
1080 CLS:FOR X=1 TO 6
1090 PRINT:PRINTR$(X)
1100 NEXT X
1110 PRINT:GOSUB 7020
1120 IF K$="Y" THEN 1200
1130 CLOSE #1:CLS:PRINT:PRINT" F
IELD TO CHANGE?":GOSUB 6500
1140 CLS:PRINT:PRINT" OLD DATA I
S:":PRINTR$(CF):PRINT:PRINT" ENT
ER NEW DATA:":LINE INPUT R$(CF):
GOTO 1070
1200 PUT #1,CR:CLOSE #1:CLS
1210 PRINT:PRINT" WANT TO ADD MO
RE? (Y/N)":K$=INKEY$:GOSUB 7030
1220 IF K$="Y" THEN 1000 ELSE 50
0
3000 FL=0:CLS:PRINT:PRINT" DO YO
U WANT MATCHES SENT TO     THE P
RINTER AUTOMATICALLY?      (Y/N)
":K$=INKEY$:GOSUB 7030:KK$=K$
3010 PRINT:PRINT" IF YOU ARE SEN
DING OUTPUT TO    THE PRINTER, B
E SURE IT IS      READY AND ON L
INE.":PRINT:GOSUB 7000
3020 CLS:PRINT:PRINT"SEARCH ON W
HICH FIELD?":GOSUB 6500
3030 PRINT:PRINT"SEARCH FOR WHAT
?":LINE INPUT TG$:SOUND 150,1
3040 IF KK$="Y" THEN 3500
3100 CLS:GOSUB 5500
3110 FOR X=1 TO LR:GET #1,X:GOSU
B 7200
3120 IF INSTR(1,R$(CF),TG$)=0 TH
EN 3200 ELSE CLS:GOSUB 7200:GOSU
B 5400
3130 PRINT:PRINT" (P)RINT LABEL,
 (N)EXT ITEM,      (R)ETURN TO MA
IN MENU,          (D)ELETE, (C)H
ANGE)"
```

One-Liner Contest Winner . . .

This is a one line "guess the random number" program. CoCo will tell you to guess a number and it will tell you if you are high or low until you guess the correct number CoCo has in mind, or memory. CoCo will also tell you how many guesses it took for you to answer correctly. Just type in the program and *RUN*.

The listing:

```
0 CLS:PRINT:PRINT"I KNOW A NUMBE
R FROM 1-100":R=RND(-TIMER):R=RN
D(100):FORX=0TO1STEP0:PRINT:INPU
T"GUESS MY NUMBER";G:N=N+1:IFG=R
 THENPRINT"YOU GOT IT IN"N"GUESS
ES!":ENDELSEIFG<R THENPRINT"TOO
LOW":NEXTELSEIFG>R THENPRINT"TOO
 HIGH":NEXT
```

Rich Dersheimer
Amanillo, TX

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book Of Adventure* and its companion *Rainbow Adventure Tape*.)

```
3140 PRINT:PRINT" INDICATE YOUR
CHOICE":K$=INKEY$
3150 K$=INKEY$:IF K$="" THEN 315
0 ELSE IF INSTR(1,"RPNDC",K$)=0
THEN 3150
3160 ON INSTR(1,"RPNDC",K$) GOTO
 3170,3190,3195,3180,3300
3170 SOUND150,1:CLOSE #1:GOTO 50
0
3180 SOUND 150,1:FOR Y=1 TO 6:R$
(Y)=STRING$(30,"^"):NEXT Y:GOSUB
 7100:PUT#1,X:GOTO 3200
3190 GOSUB 5000:GOTO 3120
3195 SOUND 150,1
3200 NEXT X: CLOSE #1
3210 IF FL=0 THEN PRINT" NO MATC
HES FOUND":GOSUB 7050
3220 GOTO 500
3300 SOUND 150,1:CLS:PRINT:FOR Y
=1 TO 6:PRINTLEFT$(STR$(Y),2);".
 ";R$(Y):NEXT Y:PRINT:PRINT" CHA
NGE WHICH FIELD? (1-6)":K$=INKEY
$
3310 K$=INKEY$:K=VAL(K$):IF K<1
OR K>6 THEN 3310 ELSE SOUND 150,
1:PRINT:PRINT" CHANGING FIELD #"
;K:PRINT:PRINT" INPUT NEW DATA:"
3320 LINE INPUT R$(K):SOUND 150,
1:GOSUB 7100:PUT #1,X:GOSUB 7200
:GOTO 3120
3500 CLS:PRINT:PRINT" SEARCHING.
..":GOSUB 5500
3510 FOR X=1 TO LR:GET #1,X:GOSU
B 7200
3520 IF INSTR(1,R$(CF),TG$) THEN
 GOSUB 7200:GOSUB 5000
3530 NEXT X:CLOSE #1
3540 IF FL=0 THEN PRINT" NO MATC
HES FOUND":GOSUB 7050
3550 GOTO 500
4000 CLS:PRINT:PRINT" PRINT ALL
RECORDS SECTION"
4010 PRINT:PRINT"  1. PRINT ON S
CREEN":PRINT"  2. PRINT ON PRINT
ER":PRINT"  3. PRINT ON LABELS":
PRINT"  4. PRINT PHONE # LIST":P
RINT"  5. RETURN TO MAIN MENU":P
RINT:PRINT"  PRESS A NUMBER (1-5
)":K$=INKEY$
4020 K$=INKEY$:PO=VAL(K$):IF PO<
1 OR PO>5 THEN 4020 ELSE SOUND 1
50,1
4030 ON PO GOTO 4100,4200,4100,4
300,500
4100 GOSUB 5500:CLS:IF PO=3 THEN
 PLAY "CDEF":PRINT" MAKE SURE PR
```

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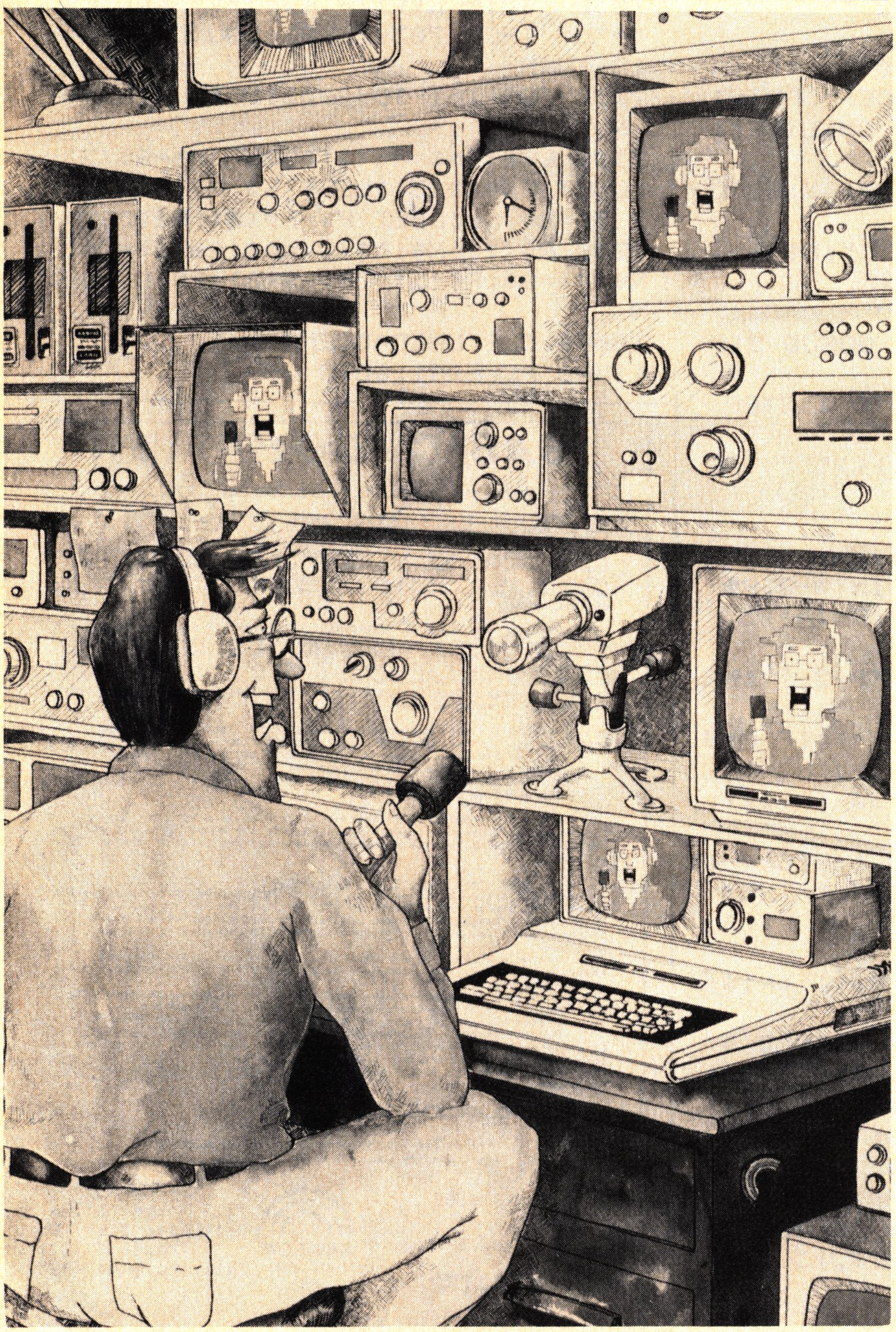
Ham Radios And CoCos— A Great Combination

By Dan Downard Rainbow Technical Editor



This month's theme is communications as you can see by our cover. I believe that a standard accessory in any ham shack today is a computer, and from the letters we receive quite a few are CoCos. As a ham operator (K4KWT), I think it would be appropriate to mention some of the CoCos uses in communications. I feel we owe the non-hams an explanation of what they are missing.

Computers and Ham Radio

I, for one, was introduced to computers via ham radio. If I may be a bit nostalgic, the days are not long past when I made the statement "Copy code with a machine? Impossible!" The first computer I had was an "Explorer 85" single-board system that had the total sum of 1K of RAM. The first thing I programmed it to do was send Morse Code. I could only send 0 through 9 and A through F as it only had a Hex keyboard, but what an accomplishment. Moving up to a 4K system with a 6800 microprocessor allowed me the luxury of receiving code. The 6800 system was purchased at a local "hamfest" and a homemade terminal was remarkedly similar to the modern Color Computer, 6847 VDG and all.

Communications

You can not only send and receive Morse code, Slow-Scan TV, RTTY, ASCII and Facsimile with a CoCo, but perform a myriad of technical tasks. My transceiver has the facility of remote tuning and operation from a computer via a serial interface. Another dream I used to have was operation of the ham

---

(Dan Downard is an electrical engineer and has been involved in electronics for 24 years through ham radio (K4KWT). His interest in computers began about five years ago and he has built several 68XX systems.)

```
INTER AND LABELS    ARE SET UP A
ND ON LINE":GOSUB 7050
4110 FOR X=1 TO LR:GET #1,X:GOSU
B 7200
4120 IF PO=1 THEN GOSUB 5300 ELS
E GOSUB 5000
4130 NEXT X
4140 CLOSE #1:GOTO 4000
4200 GOSUB 5500:PLAY"CDEF":PRINT
" MAKE SURE PRINTER IS ON LINE":
GOSUB 7050
4210 FOR X=1 TO LR:GET #1,X:GOSU
B 7200
4220 PRINT#-2,R$(1);"  ";R$(2):P
RINT#-2,R$(3);"  ";R$(4);"  ";R$
(5);"  ";R$(6):PRINT#-2,""
4230 NEXT X
4240 CLOSE #1:GOTO 4000
4300 GOSUB 5500:PLAY"CDEF":PRINT
" MAKE SURE PRINTER IS ON LINE":
GOSUB 7050
4310 FOR X=1 TO LR:GET #1,X:GOSU
B 7200
4320 PRINT#-2,R$(1);"    ";R$(6)
4330 NEXT X
4340 CLOSE #1:GOTO 4000
5000 FL=1:IF LC=2 THEN GOSUB 510
0
5010 FOR Y=LEN(R$(3)) TO 1 STEP
-1
5020 IF MID$(R$(3),Y,1)<>" " THE
N 5040
5030 NEXT Y
5040 R$(3)=LEFT$(R$(3),Y)
5050 PRINT#-2,R$(1):PRINT#-2,R$(
2):PRINT#-2,R$(3);", ";R$(4);"
";R$(5)
5060 FOR Y=1 TO 3:PRINT#-2,"":NE
XT Y:RETURN
5100 P=INSTR(1,R$(1),","):IF P=0
 THEN RETURN
5110 N1$=RIGHT$(R$(1),30-(P+1)):
N2$=LEFT$(R$(1),P-1)
5120 FOR Y=LEN(N1$) TO 1 STEP -1
5130 IF MID$(N1$,Y,1)<>" " THEN
5150
5140 NEXT Y
5150 N1$=LEFT$(N1$,Y):R$(1)=N1$+
" "+N2$:RETURN
5300 CLS:PRINT:PRINT"  RECORD #"
;X:PRINT:FOR Y=1 TO 6:PRINTR$(Y)
:NEXT Y:PRINT:GOSUB 7000:RETURN
5400 FL=1:FOR Y=1 TO 6:PRINT R$(
Y):NEXT Y:PRINT:RETURN
5500 OPEN"D",#1,F$,99
5510 FIELD #1,30 AS N$,30 AS A$,
15 AS C$,2 AS S$,9 AS Z$,13 AS P
$
5520 LR=LOF(1):RETURN
6500 PRINT:PRINT" 1. NAME":PRINT
" 2. ADDRESS":PRINT" 3. CITY":PR
INT" 4. STATE":PRINT" 5. ZIP COD
E":PRINT" 6. PHONE #":PRINT
6510 PRINT" PRESS A NUMBER (1-6)
":K$=INKEY$
6520 K$=INKEY$:CF=VAL(K$):IF CF<
1 OR CF>6 THEN 6520 ELSE SOUND 1
50,1:RETURN
7000 K$=INKEY$:PRINT"   PRESS AN
Y KEY TO CONTINUE"
7010 IF INKEY$="" THEN 7010 ELSE
 SOUND 150,1:RETURN
7020 PRINT" IS THIS CORRECT? (Y/
N)":K$=INKEY$
7030 K$=INKEY$:IF K$<>"Y" AND K$
<>"N" THEN 7030 ELSE SOUND 150,1
:RETURN
7050 FOR X=1 TO 2000:NEXT X:RETU
RN
7100 LSET N$=R$(1):LSET A$=R$(2)
:LSET C$=R$(3):LSET S$=R$(4):LSE
T Z$=R$(5):LSET P$=R$(6):RETURN
7200 R$(1)=N$:R$(2)=A$:R$(3)=C$:
R$(4)=S$:R$(5)=Z$:R$(6)=P$:RETUR
N
10000 CLS:UNLOAD:END
11000 PCLEAR1:GOTO 20
```

BASIC COMPILER

Create Machine Language Programs from Basic Programs

Thats right, with this powerful integer Compiler, called INTBASIC, one can translate Basic programs to Machine Language. Those who do not want to learn Assembly Language can use this utility program to create those fast machine language programs every ambitious programmer dreams of creating. Even fully compitant Assembly Language programmers will find INTBASIC a very valuable utility. INTBASIC was designed specifically to produce efficient 6809 machine code by utilizing the powerful instruction set available.

INTBASIC, developed by WASATCHWARE, features all standard Basic command words including two-dimensional arrays, multiple commands per line and strings. In addition, INTBASIC offers commands that are not available with Color or Extended Color Basic. All 64k of RAM can be used for program storage and/or variable storage, and all 32k of ROM can be accessed within the m.l. program. Compiled programs can be called from a Basic program, thus making interfacing easy.

INTBASIC has many features that some of the lower priced Basic Compilers can't offer. Here are just some of them:
- No Disk system is required, although it can run from disk
- Extended Color Basic is NOT required
- Enables the full 64k of RAM to be used
- 16k machines can run INTBASIC

In addition, INTBASIC is written in Machine language, not Basic. This means that compile times are very short. How short? INTBASIC can compile a 10 thousand byte Machine Language program in as little as 30 seconds!

Some other reasons to buy INTBASIC
- By converting Basic programs to machine language, program execution times are decreased by a factor of 50!
- Machine Language programs can perform many things that a Basic program cannot do. Unlimited possibilities exist when using machine language.
- Variable storage is efficiently allocated, and therefore large arrays may be used. For example, the integer array A(30000) is allowable on 64k machines.
- More than one program can reside in memory at once. As apposed to Basic which only allows one program at a time in the computer.
- System utility software can be easily developed using INTBASIC.
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station from a remote location, such as at work during my lunch break. Just call home, punch a couple of tones on the telephone Touch-Tone pad that would activate the receiver, and see what new DX (foreign) countries were on the air today. It's no longer a dream, and the systems get more sophisticated with each new generation of radios. By the way, almost all ham transceivers use microprocessors for control these days. The possibilities are unlimited.

The CoCo is a natural for communications. Not only do we have one of the most advanced microprocessors on the market, the 6809, but built-in serial I/O, A/D, D/A and expansion capabilities.

Programs are available that send and receive CW, RTTY, ASCII and Slow-Scan TV just by inputting audio from your receiver to the cassette (A/D) port on your CoCo. They lack the selectivity of the elaborate filtering networks used in some commercial communications equipment, but they work. If you have a friend who is a ham, ask him to give you a demonstration of Slow-Scan TV. Imagine receiving a picture from as far away as Japan with a radio receiver and a CoCo, and talking to the operator on the other end at the same time. The technology for this communications mode has been around for awhile, but computers are making it affordable for anyone.

A new horizon of computer applications in ham radio is called "packet radio." High speed messages are being relayed from station to station using CoCos. The 6809 is the standard micro for several packet schemes. In the future, an entire system of repeaters will allow any ham to send a message across the country activating each repeater automatically until the message reaches its destination.

On a local scale, repeaters have controllers using CoCos, allowing phone calls using a hand-held walkie-talkie. These frequencies are also used to exchange information nightly on CoCos. Ham bulletin boards, or mail boxes, differ only due to the fact that radios are used instead of modems and telephone lines.

Operator Aids

One of the things I enjoy is contests. The object of contests is to see how many other stations you can contact in a specified amount of time, whether it be in foreign countries, or maybe different states. What did I do without my CoCo? Elaborate cross-reference (dupe) sheets were designed so that you would not talk to the same station twice, wasting valuable time and points. Maybe in one weekend you would talk to as many as 1,000 other hams. Now it is as simple as typing in the other station's call letters. Not only will your CoCo check for dupes, but print an entire log of your contacts in a few minutes, a chore that used to take days.

For the everyday operator, CoCo databases allow instant retrieval of information on the ham you are talking to, whether the DX station is a new country, and what your antenna heading should be for a particular country. Your CoCo will even design your next antenna for you.

What's Next?

I guess you can sum the computerists and ham radio operators in the same quote, whose author I don't recall. "The difference between men and boys is the price of their toys." We're boys, and girls, with expensive toys. I would also like to think of us as young Thomas Edisons at the threshold of a new discovery or invention.

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For DISK users, the KEY-264K allows you to alternate between DISK and EXTENDED BASIC on the same side with simple keystrokes. No need to pull your controller or power down. You can be in EXTENDED BASIC on one side and in DISK BASIC on the other side and still switch back and forth and have full communications between the two sides.

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The 'System' And Its Important Procedures

By Michael Plog, Ph.D.
Rainbow Contributing Editor

In computer jargon, the word "system" probably has more definitions than any other single word. Different people use the same term, yet mean different things. I have heard computer salespeople talk about their system by describing a set of hardware components. Likewise, software vendors will describe a set of programs as a system. The description of an educational computer system needs to be more inclusive than either of these two examples.

To avoid confusion, let's understand the definitions. If you disagree with my use of the term, then simply go through the article and write your preferred term in place of "system." My dictionary defines system as "... an assemblage or combination of things or parts forming a complex or unitary whole." For educational computer use, a system should include three parts: hardware, software, and procedures. All three must fit together to make a single entity, which can properly be called a system.

First, an educational computer system has to have a hardware configuration. That could be as simple as a Color Computer with a single tape drive, or as complex as several computers sharing a hard disk drive. No matter how complex or simple, you cannot have a system without some sort of hardware. Hardware considerations are important when designing a system, and become essential when using the system. The hardware must fit the job to be completed.

Second, an educational system must have software. Without software, the machinery is nothing more than some very complex electronic components. For right now, we will ignore the difficulties caused by any differences between software, firmware, operating system, etc. We can safely lump all items together under some concept of "giving instructions to the machine" and call that software.

Third, a system must have a set of procedures to govern the operation. In my opinion, this is the most important part of any system.

Consider for a moment a computer system developed to keep track of student grades. If the clerical staff never updates the records, the entire venture is worthless. School officials will never be able to get accurate student grades from the computer. Procedures of such a system must include timely updates and things like backups and formats of paper records to accompany electronic records.

The concept of procedures of a computer system go much further than this simple example. A complete computer system can impact on many operations of a school (or business, home, hobby, etc.). For example, teachers will need to have a specific time limit for giving grade updates to the people who operate the computer. If the updates are not delivered on time, the system is still worthless — it will not produce the desired results for school officials.

Someone somewhere has possibly outlined all the necessary criteria for procedures of a computer system. I have not seen such an outline. No such outline will be presented here. Instead, we will concentrate on a few aspects uniquely connected with an educational system.

Training is essential for any successful implementation of a computer system. Training on the equipment is necessary, but not sufficient. Teachers need to know how to operate computers, but beyond that, teachers need to be taught the importance of computers in the classroom.

This is no easy task. We are talking about training in such areas as attitudes, behaviors, and even emotional ap-

(Michael Plog received his Ph.D. degree from the University of Illinois. He has taught social studies in high school, worked in a central office of a school district, and currently is employed at the Illinois State Board of Education.)

proaches to dealing with situations. The task of teacher training is the school administrations' responsibility, as well as the responsibility of the unofficial educational leaders (usually from the ranks of teachers) found in any school setting. No matter how it is done, the final outcome must be that teachers understand how a computer can be important in their classrooms. This is a crucial part of the procedures of an educational computer system.

Another important aspect of system procedures is the incorporation of computers in classrooms. Assume that a significant number of teachers have a good understanding of the importance of computers. Assume further that machines and selected software are available to these classrooms. The task (part of the overall procedures of the system) remains as to how to incorporate computers in the educational experiences of students.

I recently heard about a school that implemented computers in classrooms last school year. Each teacher was assigned a computer for two weeks. At the end of that time, the computer moved on to another classroom and teacher. From the report I received, some teachers were elated at the prospect of having a computer, if just for a short time. Some teachers, however, found this to be disruptive to the learning process and generally disappointing. About the time that the students (and the teacher) discovered how to operate the machine, it was removed.

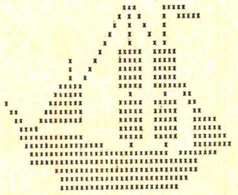
Now, it may be that the school the administration wanted all students to have some exposure to computers, with a more intensive implementation to occur that particular school year. Possibly, the administration received some computers and wanted to distribute time on the machines in a "fair" manner. It is also possible that the administration had no idea what to do with the computers, and were on a "fishing trip" — (Let some teachers figure out what can be done with the machines, then tell everyone else). I do not know what the administration had planned, or what the goals of this example were. Therefore, I cannot pass judgment on the experience. There are, however, a few rules that should be followed in incorporation procedures.

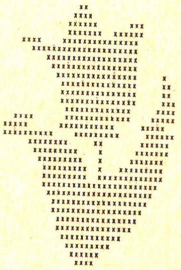
One major rule for incorporation procedures is to have as little disruption of the normal classroom activities as possible. Disruption only causes negative attitudes about educational uses of computers, which must be corrected before successful implementation can occur.

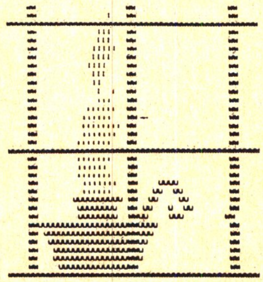
Another "rule of thumb" is that computer incorporation in a classroom can be achieved more smoothly if consideration is given to the material being covered. If teachers can be shown that the same material can be covered more easily using computers, they will be much more likely to assist the incorporation process.

Both of these rules recognize the importance of the teacher in the incorporation process. Without cooperation from teachers, administrators will never be able to fully implement an educational computer system. Likewise, without administrative support, computer use in schools will be only a fragmented approach — a true integrated system of several parts will be impossible.

If you have any reactions you wish to share, please write me at 829 Evergreen, Chatham, IL 62629.







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Helping Youngsters Develop Their Dictionary Skills

By Steve Blyn
Rainbow Contributing Editor

This is the age of information gathering. Although the computer has presented us with new databases to help obtain information, students still need to know how to use the traditional sources of information —the dictionary and the encyclopedia.

It seems that students need to gather more and more information for the same subject each year. New discoveries, inventions, and vocabulary keep cropping up in most subject areas. Therefore, extra knowledge is continually needed to master each field of study.

One of the important skills needed to gather information is to be able to use a dictionary or encyclopedia correctly. Speed is often an important consideration in locating a word or a topic. To aid in quickly locating the word or subject needed, guide words are provided in almost all dictionaries and encyclopedias.

At the top of the pages of these reference books are the guide words. These two words indicate the first and last words covered on that page. Some reference books for younger learners pair the guide words on two pages. There is then only one guide word per page. The top left of the left-hand page contains the first entry on the two pages and the top right of the right-hand page contains the last entry covered.

In either case, any word that falls alphabetically between the two guide words will be included on that page or two pages. Words that come alphabetically before the first guide word will be found on a previous page and words that fall alphabetically after the second guide word will be found on a subsequent page.

> ***"Children are often embarrassed to admit that they really have never noticed the words at the top of the page or truly don't know how to use them."***

I have seen too many students spend inordinate amounts of time in trying to locate the word they were looking up. Their time would be much better spent in researching the information they were seeking.

Children are often embarrassed to admit that they really have never noticed the words at the top of the page or truly don't know how to use them. We, as parents and teachers, should, therefore, make an effort to teach this necessary skill. We should not make the mistake of assuming that the student knows how to use the guide words.

This month's program drills students in the use of guide words. The guide words of four pages from a popular dictionary are presented. A word that is located on one of the pages is shown. The student should enter the correct page number on which this word can be found. At the end of the session, a report on the number of correct answers is given.

There are 10 words and page numbers in the *DATA* lines. You may, of course, add more examples to make the program more challenging. The number of examples is represented by the variable *L* in Line 60. Change the *L* value in Line 60 and the dimension statements in Line 70 to correspond to the number of words you wish to use.

(Steve Blyn teaches both exceptional and gifted children, holds two master's degrees and has won awards for the design of programs to aid the handicapped. He and his wife, Cheryl, own Computer Island.)

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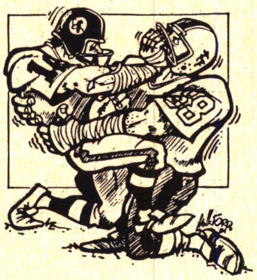

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A$ represents the word and *B* represents the page number. *B* is not a string because it only contains numeric data. The *DATA* is at the end of the program. Add as many additional *DATA* statements as you indicated in the dimension statements above. You may continue on the existing *DATA* Line 350 or begin your own in Line 360.

Lines 110-150 contain the guide words for our four sample pages. These too, may easily be modified to your purposes by replacing them with your own guide word examples.

Lines 170-210 contain a routine for randomizing the *DATA* and presenting it in a non-repeating format. These lines will continue to function correctly without change as you increase or alter the *DATA*.

We hope that you will use this program to help increase someone's research skills. As always, please feel free to modify the program to your and the children's needs.

180 70
END 62

The listing:

```
10 REM"STEVE BLYN"
20 REM"COMPUTER ISLAND,NY,1984
30 CLEAR 1000
40 Z=RND(-TIMER):'***RANDOMIZE
50 S$=STRING$(32,239):'*** MAGEN
TA LINE
60 J=0:L=10:G=0
70 DIMA$(L),B(L):'*** ALTERABLE
 TO THE NUMBER OF WORDS USED
80 FOR S= 1 TO 10:READA$(S),B(S)
:NEXT S
90 CLS0:PRINT@7,"using guide wor
ds";
100 PRINT@32,S$;
110 PRINTTAB(6)"SAMPLE PAGES":PR
INT S$;
120 PRINT"   GLACIER    290   GL
ASS"
130 PRINT"   GLASSINE   291   GL
IDER"
140 PRINT"   GLIM       292   GL
ORY"
150 PRINT"   GLOSS      293   GL
UT"
160 PRINTS$;
170 FOR X=1 TO 10:N(X)=X:NEXT X
180 R=RND(L):T=N(R)
190 N(R)=N(L):L=L-1
200 PRINT@320,STRING$(160,128);
210 IF L<0THEN GOTO 300
220 J=J+1:PRINT@91,"#";J;
230 PRINT@288,"THE WORD ...";A$(
T);"... CAN BE"
240 PRINT"FOUND ON PAGE NUMBER .
..";:INPUT C
250 IF C=B(T) THEN PRINT@394,"CO
RRECT";:G=G+1:SOUND240,3:GOTO270
260 IF C<>B(T) THEN SOUND40,2:PR
INT@384,"SORRY,THE ANSWER IS PAG
E ";B(T)
270 PRINT@452,"press <enter> to
go on";
280 EN$=INKEY$
290 IF EN$=CHR$(13) THEN 180 ELS
E 280
300 FOR T=200 TO 255 STEP 5:SOUN
DT,2:NEXT T
310 PRINT@288,"YOU GOT"G"CORRECT
 THIS TIME."
320 PRINT:PRINT"PRESS a TO GO AG
AIN OR e TO END.";
330 AN$=INKEY$
340 IF AN$="A" THEN RUN ELSE IF
AN$="E" THEN END ELSE 330
350 DATA GLAD,290,GLEE,291,GLINT
,292,GLOVE,293,GLOW,293,GLOOM,29
2,GLEAM,291,GLAND,290,GLIB,291,G
LITTER,292
```

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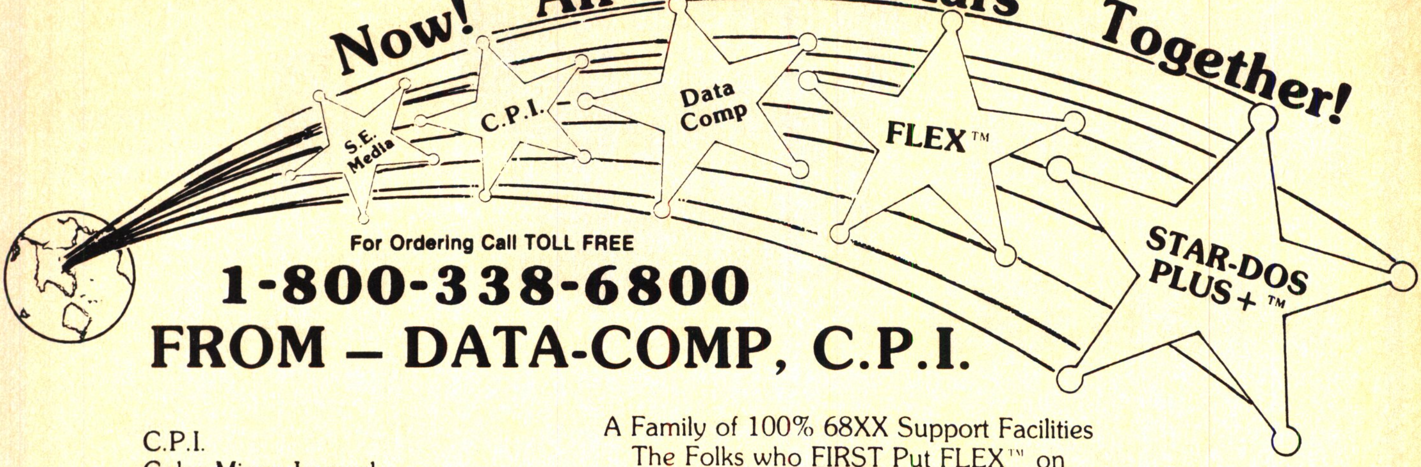

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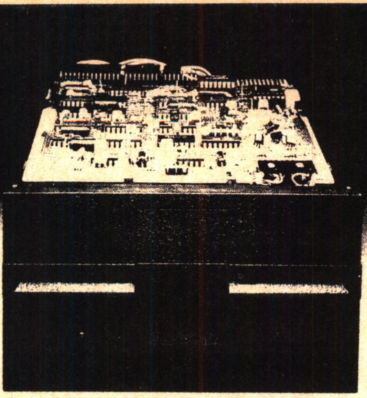

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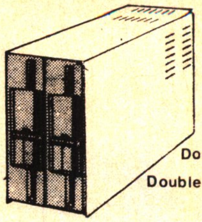

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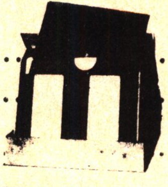

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The OS-9 Device Driver

By Steve Den Beste

It should not surprise anyone that the new Radio Shack Deluxe RS-232 Program Pak (referred to in the rest of this article as "the RS-232 Pak") can be made to work with the Multi-Pak Interface and OS-9. Unfortunately, as I write this, Radio Shack hasn't acknowledged this. This article presents a driver that allows you to use the RS-232 Pak with OS-9.

To use it, type in the driver listing and assemble it. Then type in the device descriptor and assemble it. These must be in separate files. To actually use them it is necessary to build a new operating system using *OS9GEN*, then use *DSAVE* to copy all the operating system files onto it. Once the device is installed in OS-9, you may access it as *"/TT."* The RS-232 Pak must be in slot three of the Multi-Pak Interface.

(Steve Den Beste has been a professional software engineer for eight years. He previously developed microprocessor software for Tektronix, and now works for Test Systems Strategies, a start-up engineering company. He boasts of owning "the most stacked CoCo on earth.")

The RS-232 Pak possesses a Synertek 6551 ACIA. This Asynchronous Communication Interface Adaptor has a built-in Baud rate generator and other nifty things. The interrupt line from the 6551 is hooked to the *CART* line on the cartridge connector, which in turn can be hooked to the *FIRQ* line of the 6809. This driver, as a result, is interrupt driven. I have found that when I have a friend on the remote port, both he and I can type to interactive programs (like the editor) and neither notices that the other is there unless one of us accesses the disk.

The driver itself is heavily adapted from an example device driver given in the Microware OS-9 System Programmer's guide.

As given in this article, the Baud rate for the port is set by *XMODE* (or power up defaults) before the device is ever used. Using *TMODE* to change Baud will have no effect on the Baud rate. In order to change the Baud rate you have to reboot your system, and use *XMODE* to change the Baud rate before ever sending or receiving anything from it. This is caused by the way that OS-9 uses the various entries in the device driver.

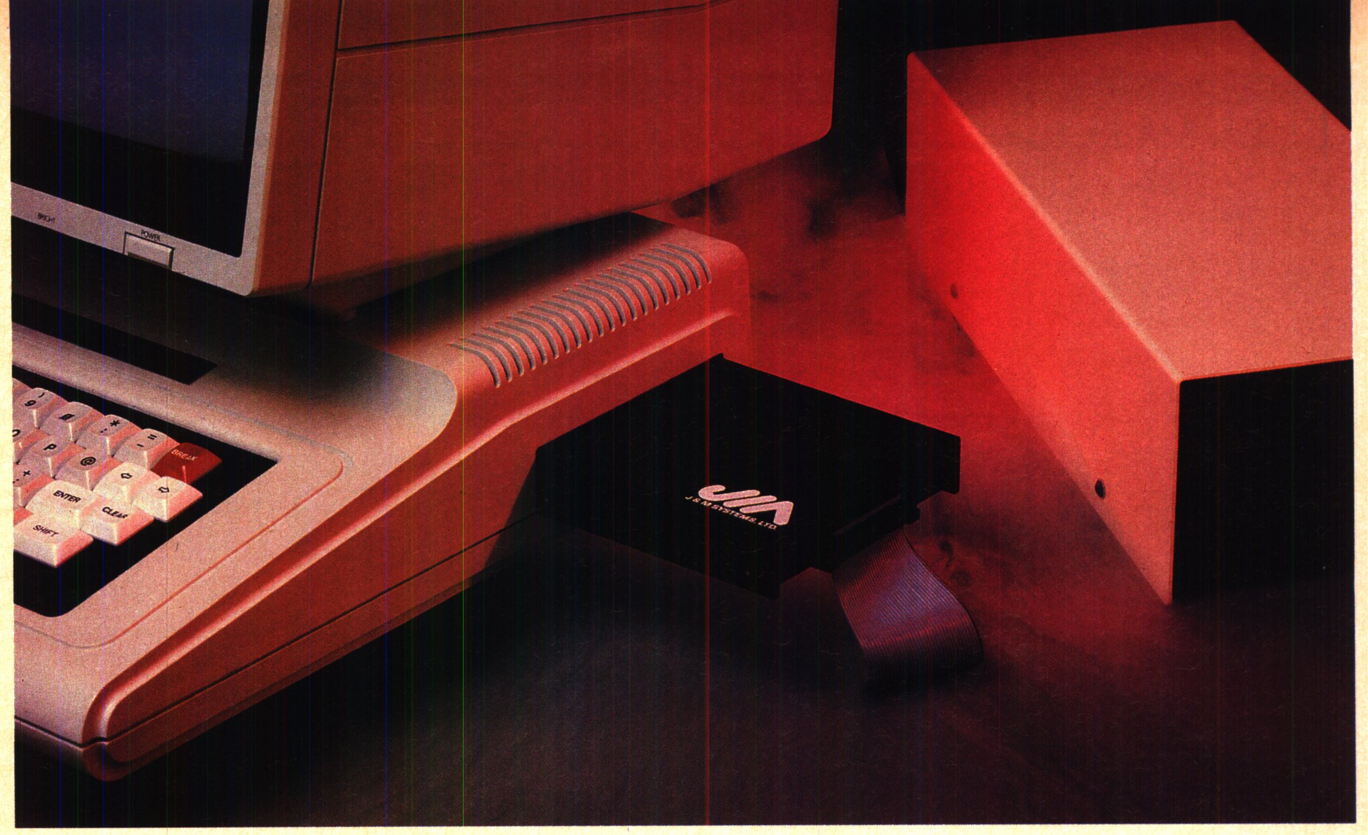
The "parity" setting in the *TMODE* and *XMODE* commands is actually used for two things. It is bit encoded as follows:

Bit 6,5 = 00 - 8 bits per word
01 - 7 bits per word
10 - 6 bits per word
11 - 5 bits per word

Bit 2,1,0 = 000 - No Parity
001 - Odd Parity
011 - Even Parity
101 - Mark Parity
110 - Space Parity

Despite the way the bits are set in the *MOD* command, this driver is *not* re-entrant. It is using a fixed location in low memory to keep a pointer to its scratch memory. This is necessary so that the interrupt driver can find it.

For those of you that don't want to type these programs in, and don't mind paying the phone bill, you may call (503) 641-0879 through October and log in as *"DRIVER."* This system is up and enabled for dial-up use when I am not using it. I wish to thank Rick Bensene for invaluable technical assistance, Dave Skinner for the loan of the 7D02 and Stan Dolson for moral support.



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The listing:

```
 NAM RS6551


*
* Device Driver for the RS Deluxe RS232 Pak
*
*     By Steven Den Beste
*
*  (Heavily adapted from an example SCF-type device driver
*   given in the Microware OS-9 System Programmer Guide)
*

*
* The next IFP1 looks like this:
*
* ifp1
* use /d0/defs/os9defs
* use /d0/defs/scfdefs
*IT.BAU EQU $27
*IT.PAR EQU $26
* endc
*
 ifp1
 use /d0/defs/os9defs
 use /d0/defs/scfdefs
IT.BAU EQU $27
IT.PAR EQU $26
 endc
 TTL Driver for the RS Deluxe RS232 Program Pak

INPSIZ set 100 input  buffer SIZE (<=256)
OUTSIZ set 40 output buffer SIZE (<=256)



**********
* Static storage offsets
*
 ORG V.SCF room for SCF variables
INXTI RMB 1 input  buffer NEXT-IN  ptr
INXTO RMB 1 input  buffer NEXT-OUT ptr
ONXTI RMB 1 output buffer NEXT-IN  ptr
ONXTO RMB 1 output buffer NEXT-OUT ptr
INPBUF RMB INPSIZ input  buffer
OUTBUF RMB OUTSIZ output buffer
SCRATCH RMB 1 Scratch location
STATUS RMB 1 Scratch=hardware status
MODMEM EQU . TOTAL STATIC STORAGE REQUIREMENT

**************
* MODULE HEADER
MODBEGIN EQU *
 MOD MODEND,MODNAM,DRIVR+OBJCT,REENT+1,MODENT,MODMEM
* Note that this is NOT a reentrant module, sigh.

 FCB UPDAT.
MODNAM FCS "RS6551"

 fcb 1 edition number

MODENT LBRA INIT
 LBRA READ
 LBRA WRITE
 LBRA GETSTA
 LBRA PUTSTA
 LBRA TRMNAT


* MEMPTR is a location in low memory that is
* not used by OS9. It is used to point to the
* "device memory area" passed to this driver
* when it is installed. MEMPTR is needed so
* so that the interrupt handler can find this
* area.
MEMPTR EQU $11D

* BAUDTAB - used to translate baud rates from
* the XMODE/TMODE commands into the hardware settings
BAUDTAB FCB $13,$16,$17,$18,$1A,$1C,$1E,$1F

* The following are offsets from the base address
* of the hardware
HTDATA EQU 0 Transmit data register
HRDATA EQU 0 Receive data register
HRESET EQU 1 Reset the 6551 (when written)
HSTAT EQU 1 Status of the 6551 (when read)
HCOMMAND EQU 2 Command register of the 6551 (R/W)
HCONTROL EQU 3 Control register of the 6551 (R/W)
 pag
******************
* INIT
*   Initialize the 6551.
*
* On entry, U points to the device memory area
*           Y points to the device descriptor
*
*
INIT EQU *
 STU MEMPTR


* Init buffer pointers
 CLRA
 CLRB
 STD INXTI,U
 STD ONXTI,U
```

```
* Initialize Multipak addressing
 LDA #$23
 STA $FF9F

* Set up the 6551 CONTROL register
 LDA IT.BAU,Y User's baud rate
 LEAX BAUDTAB,PCR
 LDB A,X Translate to hardware baud rate
 LDA IT.PAR,Y
 ANDA #$60
 STA SCRATCH,U
 ORB SCRATCH,U Add in the word length
 LDX V.PORT,U
 STA HRESET,X Soft RESET the 6551
 STB HCONTROL,X

* Set up 6551 COMMAND register
 LDA IT.PAR,Y
 ANDA #7
 LSLA
 LSLA
 LSLA
 LSLA
 LSLA
 ORA #$05 Enable all chip interrupts
 STA HCOMMAND,X

* Set up the FIRQ routine vector
 LEAX FIRQHAND,PCR
 STX $126
 LDA #$7E A JMP instruction
 STA $125

* Set up PIA to handle FIRQ from the CART line
 LDA #$35
 STA $FF23

* Enable FIRQ and clear CARRY
 ANDCC #$BE

* Ship a byte to prime the output interrupt
 LDX V.PORT,U
 CLRB
 STB HTDATA,X
 RTS


***************
* READ
*   return ONE BYTE of input from the 6551
*
* PASSED: (Y)=PATH DESCRIPTOR
*         (U)=STATIC STORAGE address
* returns: (A)=input BYTE (carry clear)
*     or   CC=SET, B=ERROR code if error
*
READ00 BSR ACSLEP wait for acia data
READ LDB INXTO,U (input buffer) NEXT-OUT ptr
 LEAX INPBUF,U address of input buffer
 ORCC #FIRQM calm interrupts
 CMPB INXTI,U any data AVAILABLE?
 BEQ READ00 ..No; wait, and retry
 ABX
 LDA HRDATA,X Get the char
 INCB ADVANCE NEXT-OUT ptr
 CMPB #INPSIZ-1 end of circular buffer?
 BLS READ10 ..No
 CLRB reset ptr to start of buffer
READ10 STB INXTO,U save updated Buffer ptr
 CLRB
 LDB V.ERR,U Transmission error?
 BEQ READ90 ..No; return
 STB PD.ERR,Y return error bits in PD
 CLR V.ERR,U
 COMB return carry set
 LDB #E$RD signal read error
READ90 ANDCC #$FF-FIRQM Enable FIRQ
 RTS

**********
* ACSLEP - Sleep for I/O activity
*  This version HOGS CPU if signal pending
*
* Passed: (cc)=IRQ's MUST be disabled
*          (U)=Global Storage
*          V.BUSY,U=current proc id
* Destroys: possibly PC
ACSLEP PSHS D,X
 LDA V.BUSY,U get current process id
 STA V.WAKE,U arrange wake up signal
 ANDCC #$FF-FIRQM interrupts ok now
 LDX #0
 OS9 F$SLEP wait for input data
 LDX D.PROC
 LDB P$SIGN,X signal present?
 beq ACSL90 ..No; return
 cmpb #S$INTR Deadly signal?
 bls ACSLER ..Yes; return error
ACSL90 CLRB clear carry
 PULS D,X,PC return

ACSLER LEAS 6,S Exit to caller's caller
 COMA return carry set
 RTS

***************
* WRITE
*   WRITE char to 6551
*
* PASSED: (A)=char to write
*          (Y)=PATH DESCRIPTOR
*          (U)=STATIC STORAGE address
* returns: CC=SET IF BUSY (output buffer FULL)
*
WRIT00 BSR ACSLEP sleep a bit
WRITE LEAX OUTBUF,U output buffer address
 LDB ONXTI,U (output) NEXT-OUT ptr
 ABX
 STA HTDATA,X PUT char in buffer
 INCB ADVANCE the ptr
 CMPB #OUTSIZ-1 end of circular buffer?
 BLS WRIT10 ..No
 CLRB reset ptr to start of buffer
WRIT10 ORCC #FIRQM disable interrupts
 CMPB ONXTO,U buffer FULL?
 BEQ WRIT00 ..Yes; sleep and retry
 STB ONXTI,U save updated NEXT-IN ptr
 LDX V.PORT,U
 LDA HCOMMAND,X
 ANDA #$F3
 ORA #$04 Enable output interrupt
 STA HCOMMAND,X
 ANDCC #$FF-FIRQM enable FIRQ
WRIT90 CLRB (return carry clear)
 RTS

***************
* GETSTA/PUTSTA
*   GET/PUT 6551 STATUS
*
* PASSED: (A)=STATUS CODE
*         (Y)=PATH DESCRIPTOR
*         (U)=STATIC STORAGE address
* returns: varies
GETSTA CMPA #SS.Ready READY STATUS?
 BNE GETS10 ..No
 LDA INXTO,U
 SUBA INXTI,U any data AVAILABLE?
 BNE WRIT90 ..Yes; return carry clear
 COMB
 LDB #E$NRDY
 RTS
GETS10 CMPA #SS.EOF End of file?
 BEQ WRIT90 ..Yes; Return carry clear

PUTSTA COMB return carry set
 LDB #E$USVC UNKNOWN SERVICE CODE
 RTS

***************
* TRMNAT
*   TERMINATE 6551 processing
*
* PASSED: (U)=STATIC STORAGE
* returns: NOTHING
*
TRMN00 BSR ACSLEP wait for I/O activity
TRMNAT LDX D.PROC
 LDA P$ID,X
 STA V.BUSY,U
 STA V.LPRC,U
 LDB ONXTI,U
 ORCC #FIRQM disable interrupts
 CMPB ONXTO,U output done?
 BEQ TRMN00 ..No; sleep a bit
 LEAX TRAP,PCR
 STX $126
 RTS

***************
* FIRQHAND
*
* This guy is called directly by the FIRQ vector
*
* All registers contain things from the background
* and all must be preserved by this routine
* but the FIRQ automatically saves CC
*
FIRQHAND PSHS D,X,Y,U
 LDU MEMPTR
 LDX V.PORT,U Find the hardware
 LDA $FF22 Strobe the PIA to clear FIRQ
 LDA HSTAT,X Get 6551 status.
 STA STATUS,U Save for second check
 BITA #$8 Recvd char waiting?
 BEQ FIRQ10
 BSR IN6551
FIRQ10 LDA STATUS,U
 BITA #$10 Transmit ready?
 BEQ FIRQ20
 BSR OUT6551
firq20 PULS D,X,Y,U
TRAP RTI

****************
* OUT6551
```

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```
* Interrupt handler for output
*
* PASSED: (A)=6551 STATUS REGISTER CONTENTS
*         (X)=6551 port address
*         (U)=Memory area address
*
OUT6551 LEAY OUTBUF,U output buffer ptr
 LDB ONXTO,U (output) NEXT-OUT ptr
 CMPB ONXTI,U output buffer already empty?
 BEQ OUTEMPTY ..Yes; disable output IRQ, return
 CLRA
 LDA D,Y next output char
 INCB ADVANCE NEXT-OUT ptr
 CMPB #OUTSIZ-1 end of circular buffer?
 BLS OUT10 ..No
 CLRB
OUT10 STB ONXTO,U save updated NEXT-OUT ptr
 STA HTDATA,X WRITE the char
 CMPB ONXTI,U last char in output buffer?
 BNE WAKEUP ..No
OUTEMPTY LDA HCOMMAND,X Get value of command register
 ANDA #$F3
 ORA #$08 TR ON, TR INT disabled
 STA HCOMMAND,X

WAKEUP LDB #S$WAKE WAKE UP SIGNAL
 LDA V.WAKE,U OWNER WAITING?
WAKE10 BEQ WAKE90 ..No; return
 OS9 F$SEND
WAKE90 clr V.WAKE,U
 RTS

***************
* IN6551
*   process 6551 input INTERRUPT
*
* PASSED: (A)=STATUS REGISTER data
*         (X)=6551 port address
*         (U)=Memory area address
*
* NOTICE the ABSENCE of ERROR CHECKING HERE
*
IN6551 LDA HRDATA,X READ input char
 LEAX INPBUF,U input buffer
 LDB INXTI,U (input) NEXT-IN ptr
 ABX
 STA 0,X save char in buffer
 INCB update NEXT-IN ptr
 CMPB #INPSIZ-1 end of circular buffer?
 BLS IN2 ..No
 CLRB
IN2 CMPB INXTO,U input OVERRUN?
 BNE IN25 ..No; good
 LDB #$20 mark overrun error
 ORB V.ERR,U
 STB V.ERR,U
 BRA IN26 throw away character
IN25 STB INXTI,U update NEXT-IN ptr
IN26 ANDA #$7F
```

```
 BEQ WAKEUP ..pass nulls without ctl checking
 CMPA V.PCHR,U PAUSE char?
 BNE IN3 ..No
 LDX V.DEV2,U PAUSE DEVICE STATIC
 BEQ WAKEUP ..None
 STA V.PAUS,X REQUEST PAUSE
 BRA WAKEUP

IN3 LDB #S$INTR INTERRUPT SIGNAL
 CMPA V.INTR,U keyboard INTERRUPT SIGNAL?
 BEQ IN4 ..Yes
 LDB #S$ABT ABORT SIGNAL
 CMPA V.QUIT,U keyboard ABORT SIGNAL?
 BNE WAKEUP ..No
IN4 LDA V.LPRC,U last process ID
 BRA WAKE10 SEND ERROR SIGNAL

MODCRC EQU *
 emod Module CRC

MODEND EQU *



 MOD TTEND,TTNAME,$F1,$81,TTMGR,TTDRV
 FCB 03 MODE
 FCB 255 24-bit device address (FF[HEX] if not used!)
 FDB $FF68
 FCB TTNAME-*-1
 FCB 0 SCF device


 FCB 0 Upper and lower case
 FCB 1 Video BACKSPACE
 FCB 0 -BSL
 FCB 1 ECHO
 FCB 1 Auto-linefeed
 FCB 0 No nulls at CR
 FCB 1 Pause enabled
 FCB 16 Lines per page
 FCB $08 Backspace character
 FCB $18 Delete line
 FCB $0D End of record
 FCB $1B End of file
 FCB $04 Reprint line
 FCB $01 Duplicate last line
 FCB $17 Pause
 FCB $03 Abort (Interrupt)
 FCB $05 Quit
 FCB $08 Back space echo
 FCB $07 Line overflow echo
 FCB $25 Parity=0, 7 data bits
 FCB $01 300 Baud
 FDB TTNAME OFFSET TO ECHO DEVICE
TTNAME FCS "TT"
TTDRV FCS "RS6551"
TTMGR FCS "SCF"
 EMOD
TTEND EQU *
```

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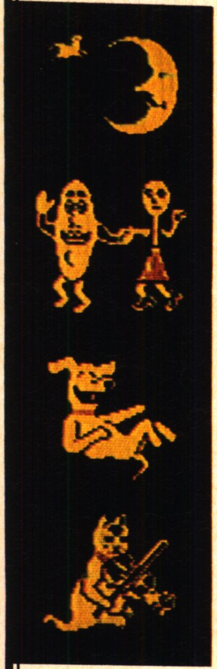

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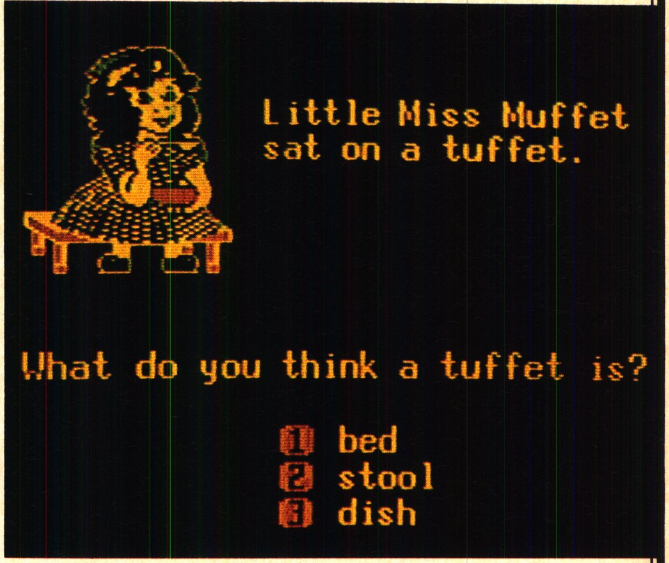

```
Little Miss Muffet
sat on a tuffet.

What do you think a tuffet is?

1 bed
2 stool
3 dish
```

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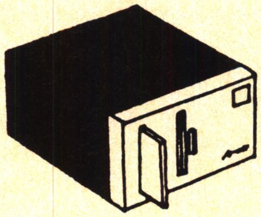

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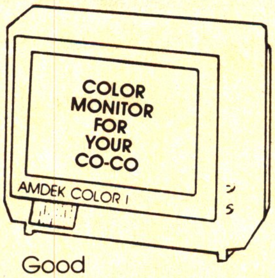
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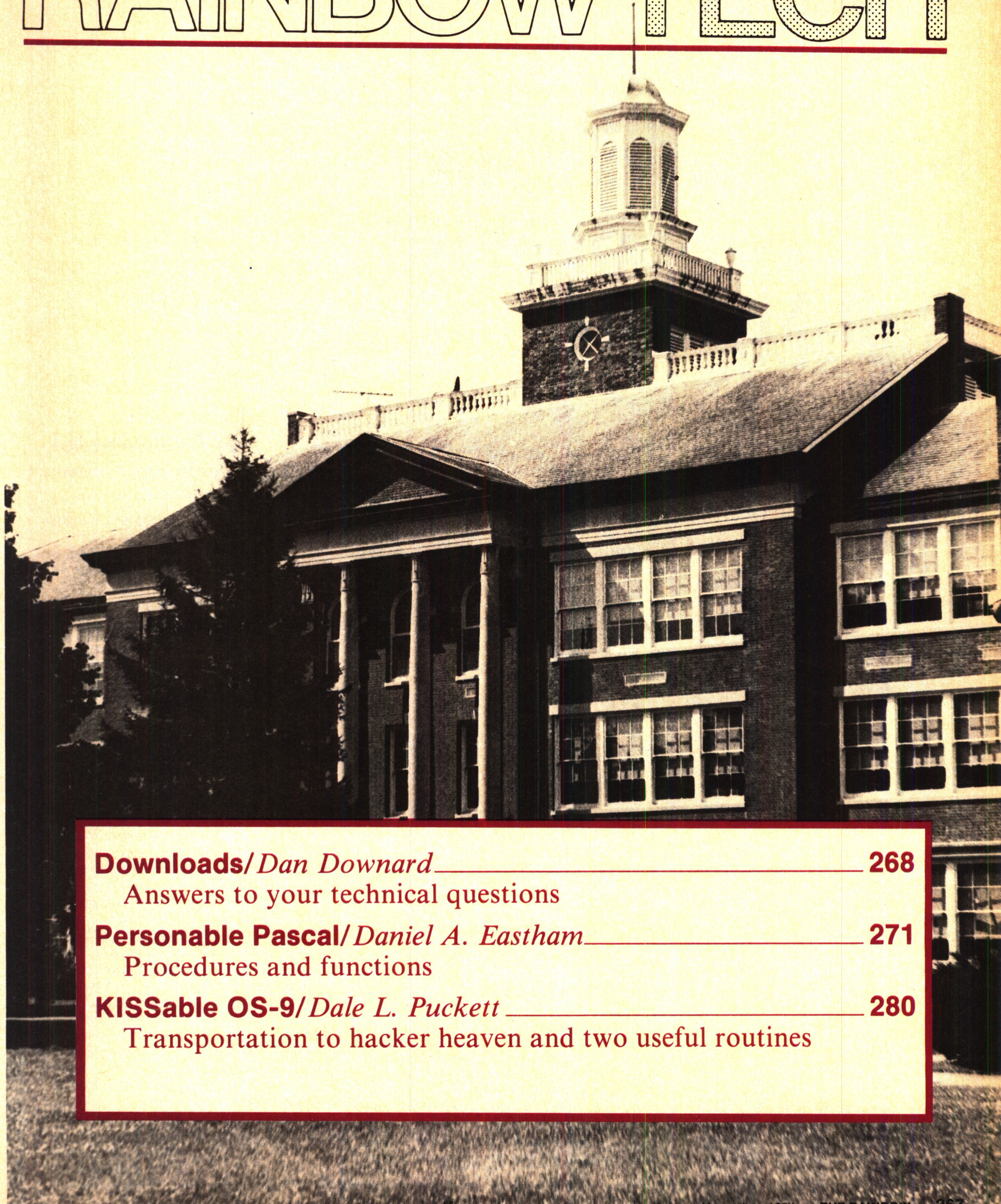

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Answers to your technical questions

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Procedures and functions

KISSable OS-9/*Dale L. Puckett* — 280
Transportation to hacker heaven and two useful routines

RAINBOWTECH DOWNLOADS

Some Easy Steps To Transmit With Null Modem

By Dan Downard
Rainbow Technical Editor

• *Can I run a RS-232C cable from the RS-232 jack on a CoCo 2 to the RS-232 jack on a CoCo 1 (silver cased one)?*

I called Radio Shack in Texas and the hardware and communications engineer told me I needed a null modem. I then called the local Radio Shack store and the customer representative took one out of the box and described it to me. One jack had four pins, the other jack had nine pins; those two female jacks were in a small box and the price was $30. Do you know what all this is about?

Could you spoon feed some of us OS-9ers about the details of connecting two CoCos. I have two, and would like to use one and let my small cousins use the other one.

Dennis Anderson
Brooklyn, NY

A null modem is nothing more than a cable with a connector at each end. The send and receive lines are interchanged at one end.

In RS-232 technology, Pin 2 of the DB-25 connector is the Transmit Data line. Pin 3 is the Receive Data line. DB-25 is the terminology for a standard 25-pin connector used for RS-232 connections. Since our CoCos only have four pins, we can say that Transmit Data is Pin 4 and Receive Data is Pin 2 of the four-pin jack on the rear of the computer.

Since we have to choose one device as the computer and another as the terminal, Pin 4 on one CoCo has to be connected to Pin 2 on the other, and vice versa. Thus, we have the Transmit Data of one CoCo connected to the receive Data line on the other. This is a null modem.

Don't forget the other two pins. Pin 1 at one end goes to Pin 1 at the other end, etc.

Now for communicating with OS-9. All that is really necessary to activate the time-sharing monitor in the host CoCo is to enter the command *"TSMON /T1&"*. This will activate the RS-232 port and allow operation from the remote terminal and the CoCo keyboard at the same time. Be sure that you have the terminal set at 600 Baud, the default Baud rate for CoCo OS-9. If you wish to change the Baud rate, use the *XMODE* command.

A Slower Scroller

• *I love my CoCo for what it can do for the price I paid, but when I run a long program and list it, the lines go by the screen so fast I can't review them. Is there any way to make it scroll slowly up the screen? Also, I'd like to know who offers business-oriented ROM packs I can use for listing, adding, deleting and editing my customers' names. I don't have a disk drive (I have lots of spare time on my job to wait for the cassette tape). Can you help?*

Bill Bernico
Sheboygan, WI

Try using the following little widget to slow down your scrolling rate: *POKE359,60.* This will not work for a disk system, Bill, but you are interested in tape.

For your mailing info I would recommend *TIMS* by Sugar Software. It is a tape-based database. I am not aware of any ROM packs that will do the job.

Printer Information

• *My computer is a CoCo 16K Extended* BASIC *with TRS-80 cassette recorder and a DMP-100 printer. I am practically a dummy when it comes to understanding* BASIC *so I depend on purchased software for programs.*

The June issue of RAINBOW *contains an article on the Gemini-10X printer.*

This article describes a manual that comes with the Gemini-10X and contains a world of information on the use of a printer. It says that by changing from LPRINT *to* PRINT#-2 *the information in the manual applies to the CoCo. The manual that came with the DMP-100 contains a minimum of detail on applying the printer to various programs.*

As I don't wish to purchase a printer to get the manual, can you suggest where I might purchase information on how to apply my new printer to the various programs I wish to copy?

Francis M. Lumley
Palmetto, FL

(Dan Downard is an electrical engineer and has been involved in electronics for 24 years through ham radio [K4KWT]. His interest in computers began about five years ago and he has built several 68XX systems.)

Francis, you cannot program a printer, you just change its mode of operation. In the case of a DMP-100, control sequences are sent to the printer to change the type of printing, such as emphasized, condensed, graphics, etc.

The reference to *LPRINT* vs. *PRINT#-2* in the article you mentioned was made due to the fact that on other computers the BASIC command to reroute text to the printer is *LPRINT* instead of *PRINT#-2*. Since we are dealing with CoCos, all references to *LPRINT* in the Gemini-10X manual should be changed to *PRINT#-2*.

The same information is contained in both manuals, e.g. control codes. The Gemini manual just gives examples. I wouldn't buy the manual just for the examples.

Learning To Backup

• *About once a month, my disk drive goes on a rampage. Usually, it just destroys the directory. I keep backup directories on other disks, as well as a backup directory on track zero. Last month though, the drive not only erased the directory, but damaged the directory track as well. All attempts at restoring the directory resulted in I/O Errors.*

My question is this: Is there any way to make the disk drive use the backup directory I keep on track 0 as the working directory, ignoring track 17 completely, or is this a ROM function?

Also, is there a way to save a machine language program written on OS-9 so that it can later be loaded and used with Disk BASIC? If it can't be done on disk, is there a way to make a cassette save from OS-9?

Any information you could give me on these topics would be most appreciated.

John Ruzicka
Florham Park, NJ

John, track 17 is defined by the ROM as the directory track. You may be able to change this, but a simpler solution is evident.

Format a blank disk and try the *BACKUP* command. Unless track 17 is completely destroyed, all of the contents of the damaged disk will be copied to the new disk. Then, use your directory restoring program.

If you can't make a backup, try using one of the several disk-zapping utilities to make a sector-by-sector copy of the old disk to a freshly formatted disk. Do not copy track 17. Then, just copy track 0 of the old disk to track 17 of the new disk. It should be just like new.

The OS-9 assembler has a Motorola-compatible mode. The purpose of this mode is using the assembler for non-OS-9 programs. It can be invoked by the "m" option in the command line, or by using an *OPT* statement.

The trick is getting back to RS BASIC after using OS-9. One method I have used in the past is to enter the *DEBUG* module, change $55 to 0 and hit the Reset button. Your assembled program will still be in memory, assuming it was not located in a memory location used by BASIC.

Trapping Those Characters

• *In your November 1983 issue you had a program that would allow remote operation of the CoCo. I would like to know how to get the program to intercept a BREAK or CTRL-C code and change it to a space or skip it over altogether. If I don't get it to do this, people will be able to break out of the BBS I am making and could mess it up.*

Harris Bockoven
Fort Dodge, IA

I've received a few phone calls on this subject, Harris. Most people are interested in a BREAK key disable patch to *REMOTE* for use in bulletin boards, etc. Both are accomplished in the same manner.

In the original listing Line 730 stripped the eighth bit from the received character before returning to BASIC. The received character at that time is in the A register. By inserting the following lines between Lines 730 and 740, any character can be trapped.

```
732     CMPA #$0C   $OC=HEX CODE FOR
                    BREAK
734     BNE   IRET1 EXIT ROUTINE IF
                    NOT  BREAK
736     LDA   #0    REPLACE $0C WITH
                    NULL
```

After adding these lines, the program should be reassembled with *EDTASM+*. If you want to move the starting address change Line 160. The receive Baud rate constant is in Line 225. The transmit rate Baud constant is in Line 220. Changing these values will change the Baud rate from 300 Baud.

As corrected in a later issue, the proper receive Baud rate constant should be changed in Line 225 from $C9 to $B8. $B8 is the proper constant for 300 Baud.

Becoming Book Smart

• *I own a 64K Extended BASIC Color Computer. For the past few weeks I have been writing an assembly language program, but I have encountered a problem. How could I generate a large number of pseudo-random numbers? Using the memory map printed recently in THE RAINBOW, I have found the RND subroutine used by Color BASIC at $BF1F. I have tried to disassemble this subroutine using ZBUG, but I quickly became lost. Do you know how this subroutine works and how I could call it in one of my own assembly language programs? In my opinion, the BASIC ROM contains a gold mine of useful functions, if only a way could be found to utilize these subroutines.*

Patrick Shaughnessy
Bedford, MA

Patrick, I would suggest that you obtain a copy of *COLOR BASIC Unravelled* by Spectral Associates. Look for their ad in this month's RAINBOW.

You have the correct address for the random number generator in the Color BASIC ROM, but a thorough understanding of the floating point math used in the ROMs is necessary to utilize this subroutine. The above book is a commented disassembly of

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the ROM and should give you a head start at understanding how the entire system works.

Using All Your Memory

• *I have seen many ads in* THE RAINBOW *for memory bank switchers that allow you to use all 64K for your programs. But I thought that usable memory was limited by the SAM chip which can only read 64K at one time. So how can these programs allow you to use 64K RAM yet still allow you to use the* BASIC *ROMs which take up about 32K? The total would be 96K and I thought this was impossible for the SAM chip to monitor at once.*

I have also seen ads for 128K memory boards. Once again, exactly how much memory can we use at one time on our CoCos? These ads also talk about switching. My main question about this is how much memory can I use to write a BASIC *program?*

I have seen ads in THE RAINBOW *for program packs that give C/PM ability. What is C/PM? How is it possible to use a Z-80 on our computer? I have read that one TRS-80 business computer uses a 68000 and a Z-80 micro-processor.*

Do you know of any way to increase the actual user RAM available in BASIC*? I don't mean for storing variables or data but to use freely just like the 32K normally available. I've never heard of it done but can a different chip than the SAM be used that has the ability to monitor more memory? Or maybe a different CPU can be used as long as it remains compatible with present CoCos?*

Dominic Tynes
Poplarville, MS

You are correct, Dominic, the 6809 can only address 64K, but this means that only 64K of memory can be online at one time. Another constraint is the fact that the CoCo uses a 16-bit address bus. Two to the sixteenth power is 64K.

I am using a 64K Disk BASIC CoCo, and have 64K of RAM. I have 32K of ROM space available. I have two drives at 161K each. I guess you could say I have 428K of memory online. With two more drives this figure would change to 750K.

Even though the 6809 can address only 64K, you can have an unlimited amount of memory. I have seen 20 meg hard disks at RAINBOWfests.

It is possible to address more than 64K of RAM using a method called bank switching. Under normal modes of operation your CoCo has 32K of RAM and 32K of ROM (only 24K of ROM space is actually used). Let's put another 256K of memory in the CoCo. Sounds easy, doesn't it? Well it is possible. By using a latch, or addressing scheme, and some decoding hardware on the RAM chips you can divide the 256K into eight 32K segments, or banks. Each bank would replace the original 32K of RAM by poking a different value into the addressing scheme. A similar bank switching scheme is used in your present CoCo when you switch the upper half of memory from ROM to RAM.

Will this allow me to write longer BASIC programs? Not with Color BASIC. New software will be necessary to sense when one bank of RAM is full, automatically switching to the next bank, etc.

As far as using CP/M on a CoCo, a plug-in adaptor is available from Color Power Unlimited to allow the use of this operating system. CP/M is a registered trademark of Digital Research Corp. and also the name of their operating system for the Z-80 microprocessor. When you plug in this adaptor, the 6809 in your CoCo is actually replaced by a Z-80. The 6847 video display generator chip is replaced also with a 6845 allowing an 80 x 24-character screen display. You essentially have a new computer. This product will be reviewed very shortly in THE RAINBOW.

Building A Disk Drive

• *I have just inherited a Model II with one built-in disk drive, and an expansion unit containing an outboard drive.*

Is there any way I can use that outboard monstrosity as a drive 0 for my CoCo? I realize that there is probably no software sold for the CoCo in the eight-inch format, but some of the programs I have on tape are transferable to disk and it might be worth buying a controller to be able to use that big disk for data storage.

Neil Edward Parks
Beachwood, OH

I don't think your problem is insurmountable, Neil, but plan on spending a great deal of time experimenting. Even if you succeed, your software will not be compatible with any other CoCo disk system.

First, it is possible to interface an eight-inch drive with the Color Computer. The Western Digital 1793 chip used in the disk controller can be programmed to work with an eight-inch drive. I believe the clock speed will have to change. You will have to obtain a data sheet on the 1793 from Western Digital. You will also have to obtain a complete user's manual on the outboard drive obtained with your Model II and the CoCo disk controller. The rest is up to you.

I thought about doing the same thing once, but with the price of a Radio Shack disk drive taken into consideration it didn't seem to be worth the time.

Another thing to consider is the fact that the standard format for eight-inch drives is single density, 77 tracks, 16 sectors per track. Some simple math will produce the fact that there is just as much storage capacity on a 5¼-inch double density diskette.

If you still are not discouraged, look at an article in May 1981 *Byte* named "Build a Super Simple Floppy Disk Interface."

At the same time, if any of our readers have been successful in interfacing an eight-inch drive, please write. We will pass along any information received.

Your technical questions are welcomed. Please address them to: Downloads, THE RAINBOW, P.O. Box 385, Prospect, KY 40059. We reserve the right to publish only questions of general interest and to edit for space and clarity.

RAINBOWTECH

16K

PERSONABLE PASCAL

Procedures And Functions

By Daniel Adams Eastham
Rainbow Contributing Editor

Now that we have learned about PASCAL's executable statements and most of its data typing capabilities, we can delve a little into structuring a program. This is something you have always done when writing a program. At the very least you set up a first part that does all of your initialization including things like opening files and reading in initial parameters. This is followed by a second part which performs whatever processing the program is primarily written to do. Finally, there is a last part which prints totals, closes files or performs any other cleanup activities required.

Although a BASIC program cannot have any formal structure, most of us have at least done some informal structuring using ranges of line numbers or by imbedding comments. Setting up this structure makes it easier to figure out where a particular activity is occurring in your program when you need to debug or change it.

(Daniel Adams Eastham holds a B.S. degree in computer science and has 13 years experience in systems and communications programming, including work on the original Telenet packet switching network. He is the author of the DEFT PASCAL Workbench *and is currently president of DEFT Systems, Inc.)*

PROCEDURE Statement

In PASCAL, you use PROCEDURE and FUNCTION "declaration" statements in order to directly specify the structure of your program. These statements not only formally divide up your program, but can also provide some very powerful features. A PROCEDURE has the following form:

```
PROCEDURE <identifier> [(
   <parameter>; <parameter>; ...;
   <parameter>)];
<declaration statements>
BEGIN
<executable statements>
END;
```

You can see that a procedure is structured almost identically to a PASCAL PROGRAM. The <identifier> is the name of the procedure and is used in order to *invoke* or activate the procedure.

Parameters

After the <identifier> you may have a parameter definition. A parameter is a piece of data that affects the operation of the procedure. For example, in BASIC the SET statement can be thought of as a procedure that has three parameters: the X and Y coordinates of a dot on the screen and the color to which that dot should be set. Each time you invoke the procedure, you can pass it different values to operate on.

In PASCAL you are not restricted to the predefined procedures and functions that come with the language. You can define your own including defining the number, types and meaning of the parameters that must be passed to them. This gives you a lot of flexibility in that you can take large or small sections of your program and make them into your own procedures and functions to simplify the flow of your program at any given point.

The <parameter>s in the PROCEDURE statement itself are referred to as "formal" parameters. At the point in your program where you actually invoke the procedure and specify the variables, constants or expressions to be used, the parameters are referred to as actual parameters. The general form of a formal parameter is:

```
VAR <identifier>, ..., <identifier> :
   <type identifier>
                OR
<identifier>, ..., <identifier> : <type
   identifier>
```

The VAR at the beginning of a list of <identifiers> is optional and when present indicates that each <identifier> represents a reference parameter as opposed to a value parameter. The difference between these two types of parameters is explained in detail later on.

The <identifier>s are the names of the parameters that will be used inside the procedure. They are variables of type <type identifier> which are known only within the procedure and can be used inside the procedure like any other variables. For example:

```
PROCEDURE SimpleProc (First,
                  Second : Real ;
              VAR Sum : Real);
BEGIN
  Sum := (First + Second) /
    AnotherVar;
END;
```

In this example, First and Second are value parameters and Sum is a reference parameter. All three are used in the procedure's assignment statement.

The variable AnotherVar is a variable which is defined globally to this procedure. In a future article, we will discuss block structure and scoping. For now, variables will only be considered to be defined within a procedure or in the main program. AnotherVar is a variable that is defined in the main program and must be of type real or integer.

Invoking a Procedure

One important characteristic of parameter variables is that they may already be initialized with some value when the procedure begins executing. The values that they will assume will be those of the actual parameters used when the procedure is invoked. In the above example, the formal parameters First and Second assume the values of the actual parameters at the point where the procedure is invoked. For example:

```
PROGRAM SimpleProg (Input,
  Output);
VAR AnotherVar, ResultVar, Second-
  Result : Real;

    PROCEDURE SimpleProc
          (First, Second : Real ;
              VAR Sum : Real);
    BEGIN
     Sum := (First + Second) /
       AnotherVar;
    END; (* SimpleProc *)

BEGIN (* SimpleProg *)
  AnotherVar := 3.7;
  SimpleProc(7, 23.2*4, ResultVar);
  AnotherVar := 17;
  SimpleProc (AnotherVar, Result-
    Var, SecondResult);
END.
```

In the above program, AnotherVar, ResultVar and SecondResult are variables which are declared in the main program. Execution begins with the assignment of 3.7 to AnotherVar. The next statement invokes the procedure SimpleProc much like a *GOSUB* in BASIC. However, in this case the actual parameters 7, 23.2*4 and ResultVar are assigned to the corresponding formal parameters First, Second and Sum.

The result of the procedure execution is to put the value (7+(23.2*4))/3.7 into ResultVar. When the procedure is finished executing, control returns to the statement in the main program following the statement that invoked the procedure. The last procedure invocation puts the value (17+29.67567568)/17 into the variable Second Result.

Reference vs. Value Parameters

There are two ways to relate an actual parameter to its corresponding formal parameter. The first way is to copy or assign the value of the actual parameter to the formal parameter. This technique allows you to use full expressions as actual parameters since the resulting value is to be assigned to the formal parameter in exactly the same manner as if it were an assignment statement. This is the technique used by value parameters (those which do *not* have the word VAR in front of them).

The second way is to make the actual and formal parameters the same. In this case, you do not have to copy the data and if the procedure modifies its formal parameter, the actual parameter is what is actually modified. This technique is used by reference parameters (those which *do* have the word VAR in front of them). When you have defined your formal parameters as reference, your actual parameters must be variables.

Reference parameters are frequently used when passing large arrays or records for use by a procedure or when the intended result of the procedure is to modify one of the actual parameters (as in Sum in the above example).

Value parameters are used when you are treating them truly as input data, do not want to modify the actual parameter or wish to use expressions as actual parameters.

Functions

Functions are almost exactly the same as procedures except that they also have a formal returned value. A FUNCTION has the following form:

```
FUNCTION <identifier> [(<para-
      meter>;<parameter>;...;<para-
      meter>)]
   : <type identifier>;

  <declaration statements>
  BEGIN

  <executable statements>

  END;
```

You notice that this is exactly the same as a procedure except that the FUNCTION statement itself is typed (as <type identifier>). We can take our SimpleProc example and make it into a function example:

```
PROGRAM SimpleProg (Input, Out-
  put);

VAR AnotherVar, ResultVar, Second-
  Result : Real;
    FUNCTION SimpleFunc (First,
     Second : Real) : Real;
    BEGIN
     SimpleFunc:=(First+Second) /
       AnotherVar;
    END; (* SimpleProc *)
BEGIN (* SimpleProg *)
  AnotherVar := 3.7;
  ResultVar:=SimpleFunc(7,23.2*4);
  AnotherVar := 17;
  SecondResult := SimpleFunc (Ano-
    therVar, ResultVar);
END.
```

This example produces exactly the same result as the example using the procedure SimpleProc. In this case, SimpleFunc has two value parameters, First and Second and returns a Real result. The assignment statement in the function uses the function name on the left side. Every function must have at least one assignment statement which does this. It is this assignment statement which actually sets up the function's returned value.

The statements in the main program use the function on the right side of assignment statements so that the resulting value is placed in the variable on the left side. A function can be thought of as a read-only variable which can be used in expressions exactly like a variable.

Example Program — Dead Reckoning

The example program this month is a part of one I wrote a couple of years ago to help me with my flight planning. This program takes as inputs: the wind direction and speed, my aircraft speed, and my route of flight in the form of some number of cross-country legs.

With this program, we start to see how PASCAL programs look like they are written backwards. The program starting point is frequently on the last page of your listing with all the procedures and functions preceding it. In this example, we have the following procedures and functions:

FUNCTION	
Magnetic	—adds magnetic variation to a true heading or course
PROCEDURE	
Setup	—performs all program initialization
PROCEDURE	
HourMinute	—prints time values in hh:mm format
FUNCTION	
Coordinate	—reads in a coordinate value and converts it to real
PROCEDURE	
ComputeLeg	—computes and prints data for a single cross-country leg

The first statement in the program is Setup which is a call to the parameterless procedure Setup. This procedure performs all initialization functions required to get things going. In this case, it prompts for initial values for airspeed, wind speed and direction, magnetic variation (degree difference between magnetic north and true north) and departure time. It then also prints the page heading and initializes the totals to zero.

Although we don't get into detail in Input/Output until next month, this month's example does include writing to the printer. In order to do this, we declare a separate file variable (Printer) and use the REWRITE (Printer, ':-2'); statement to associate it with the printer.

All subsequent WRITE or WRITELN statements that reference the Printer file variable then go to the printer. For those of you who do not have a printer, you can change this statement to REWRITE (Printer, ':-3); to make your output go to the screen.

After invoking Setup, the main line code then has a REPEAT loop which executes once for each leg of the trip. It uses the function Coordinate in order to prompt for the latitude and longitude of a checkpoint and then invokes ComputeLeg in order to perform all processing for that leg. This procedure computes the true course and distance between this checkpoint and the previous one and then computes the proper heading to fly based on the true course, airspeed and wind conditions. It then prints the result on the printer.

After all the checkpoints have been entered, control falls through to the series of WRITELN statements which print all the totals. After this, the program ends.

If you have any questions about procedures or functions, you can call (301) 253-1300 during normal business hours for help. Next month we will go into detail about Input/Output in PASCAL.

The listing:

```
00 0000   (*********************************************
00 0000   *
00 0000   *  Program to perform dead reckoning navigation
00 0000   *  for a light aircraft
00 0000   *
00 0000   *********************************************)
00 0000
00 0000   PROGRAM DeadReckoning (Input, Output);
00 0000
00 0000   CONST Radians = 57.29577951;
00 0009         TwoRad  = 114.591559;
00 000F         Pi      = 3.141592654;
00 0015
00 0015   VAR AirSpeed, WindSpeed, WindDirect, MagneticVar,
00 0015       DepartHour, DepartMinute, TotalDist, I : Integer;
00 0015
00 0015       Longitude, Latitude, LastLong, LastLat,
00 0015       DepartTime, TotalTime : Real;
00 0015
00 0015       FirstTime  : Boolean;
00 0015       ChkPntName : String;
00 0015       Printer    : Text;
```

```
00 0015
00 0015   (*********************************************
00 0015   *
00 0015   *  Convert true (heading or course) to magnetic
00 0015   *
00 0015   *********************************************)
00 0015
00 0015   FUNCTION Magnetic (TrueValue : Integer) : Integer;
10 0015
10 0015   BEGIN
11 0019     Magnetic := (TrueValue + MagneticVar + 360) MOD 360;
11 003A   END;
00 003E   (*********************************************
00 003E   *
00 003E   *  Get initial data and print page heading
00 003E   *
00 003E   *********************************************)
00 003E
00 003E   PROCEDURE Setup;
10 003E
10 003E   BEGIN
11 0042     Page;
```

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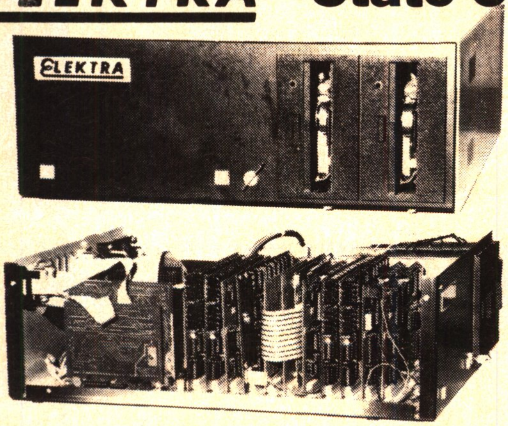

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```
11 0052     WRITELN;
11 005C     WRITELN ('DEAD RECKONING NAVIGATION');
11 0089     WRITELN;
11 0093     WRITE ('TRUE AIRSPEED (KNOTS): ');
11 00BD     READLN (AirSpeed);
11 00D5     WRITE ('WIND SPEED (KNOTS): ');
11 00FC     READLN (WindSpeed);
11 0114     WRITE ('WIND DIRECTION (DEGREES): ');
11 0141     READLN (WindDirect);
11 0159     WRITE ('MAGNETIC VARIATION: ');
11 0180     READLN (MagneticVar);
11 0198     WRITE ('DEPARTURE TIME (HR,MIN): ');
11 01C4     READLN (DepartHour, DepartMinute);
11 01EA     DepartTime := DepartHour + DepartMinute/60.0;
11 0217
11 0217     REWRITE (Printer, ':-2');
11 022F     Page (Printer);
11 0240     WRITELN (Printer, ' ':27, 'Navigation Log');
11 0270     WRITELN (Printer, ' ');
11 0288     WRITELN (Printer, '                True    Mag    Ground
11 02C8             ' True      Mag');
11 02E3     WRITELN (Printer, 'Checkpoint  Course  Course   Speed  Distance
11 0323             'Heading  Heading  Time');
11 0346     FOR I := 1 TO 68 DO WRITE (Printer, '-');
11 0383     WRITELN (Printer);
11 038E     WRITELN (Printer, ' ');
11 03A6
11 03A6     TotalTime := 0.0;
11 03BB     TotalDist := 0;
11 03C2   END;
00 03C6   (**************************************************
00 03C6   *
00 03C6   *  Print time in hhh:mm format
00 03C6   *
00 03C6   **************************************************)
00 03C6
00 03C6   PROCEDURE HourMinute (VAR OutFile : Text; Time : Real);
10 03C6
10 03C6   VAR Minutes : Integer;
10 03C6
```

```
10 03C6   BEGIN
11 03CC     Minutes := Round (Time * 60.0) - (Trunc (Time) * 60);
11 0410     WRITE (OutFile, Trunc (Time):3, ':');
11 043E     IF Minutes > 9 THEN WRITE (OutFile, Minutes:2)
11 045D                 ELSE WRITE (OutFile, '0', Minutes:1);
11 0482   END;
00 0486
00 0486   (**************************************************
00 0486   *
00 0486   *  Get Coordinate Information
00 0486   *
00 0486   **************************************************)
00 0486
00 0486   FUNCTION Coordinate (Prompt : String) : Real;
10 0486
10 0486   VAR Degree, Minute, Second : Real;
10 0486
10 0486   BEGIN
11 048D     WRITE (Prompt, '(DEG,MIN,SEC): ');
11 04BA     READLN (Degree, Minute, Second);
11 04DA     Coordinate := (Degree+Minute/60.0+Second/3600.0);
11 051A   END;
00 051E   (**************************************************
00 051E   *
00 051E   *  Compute and print one leg of the trip
00 051E   *
00 051E   **************************************************)
00 051E
00 051E   PROCEDURE ComputeLeg;
10 051E
10 051E   VAR LongDist,       (* distance between lines of longitude      *)
10 051E       LatDist,        (* distance between lines of latitude       *)
10 051E       WindTrueRad,    (* angle (radians) between wind & course    *)
10 051E       CrsWndRatio,    (* ratio of crosswind to true airspeed      *)
10 051E       HeadCrsRad      (* angle (radians) between heading & course *)
10 051E             : Real;
10 051E       Distance, TrueCourse, GroundSpeed, TrueHeading,
10 051E       WindTrueAng     (* angle (degrees) between wind & course    *)
10 051E             : Integer;
10 051E
```

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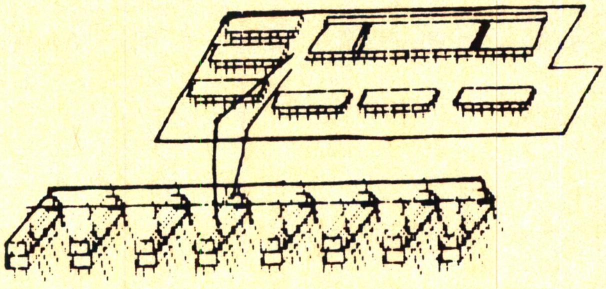

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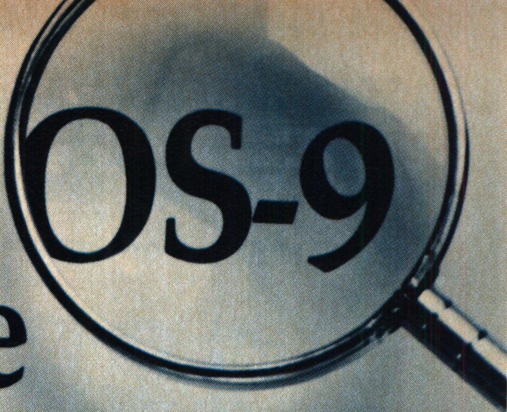

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```
10 051E   BEGIN
11 0525     LongDist := 60.0 * (Longitude - LastLong) *
11 054E                 COS ((LastLat + Latitude) / TwoRad);
11 0584     LatDist := 60.0 * (Latitude - LastLat);
11 05B0     Distance := Round (Sqrt (Sqr(LongDist) + Sqr (LatDist)));
11 05F8
11 05F8     IF ABS (LongDist) < 0.01 THEN
11 0614
11 0614           IF LatDist < 0.0 THEN TrueCourse := -90
11 0630                            ELSE TrueCourse := 90
11 063E
11 063E     ELSE BEGIN
12 0644       TrueCourse := Round (ArcTan (LatDist / LongDist) * Radians);
12 067E       IF LongDist < 0.0 THEN TrueCourse := TrueCourse + 90
12 069F                         ELSE TrueCourse := TrueCourse + 270;
12 06B4       END;
11 06B4
11 06B4     IF (WindSpeed = 0) OR (ABS (WindDirect - TrueCourse) < 5) OR
11 06F1        (ABS (ABS (WindDirect - TrueCourse) - 360) < 5)
11 072E     THEN BEGIN
12 0737       GroundSpeed := AirSpeed - WindSpeed;
12 0748       TrueHeading := TrueCourse;
12 074E       END
11 074E
11 074E     ELSE IF (ABS (ABS (WindDirect - TrueCourse) - 180) < 5)
11 078D     THEN BEGIN
12 0792       GroundSpeed := AirSpeed + WindSpeed;
12 079D       TrueHeading := TrueCourse;
12 07A3       END
11 07A3
11 07A3     ELSE BEGIN
12 07A6       WindTrueAng := WindDirect - TrueCourse + 180;
12 07C1       IF WindTrueAng > 180 THEN WindTrueAng := WindTrueAng - 360;
12 07E3       WindTrueRad := ABS (WindTrueAng) / Radians;
12 0802       CrsWndRatio := WindSpeed * SIN (WindTrueRad) / AirSpeed;
12 0837       HeadCrsRad := ARCTAN(CrsWndRatio/SQRT(1-SQR(CrsWndRatio)));
12 0884       GroundSpeed := Round (AirSpeed *
12 088F                           SIN (Pi - HeadCrsRad - WindTrueRad) /
12 08BE                           SIN (WindTrueRad));
12 08E4       IF WindTrueAng < 0
12 08EB       THEN TrueHeading := TrueCourse + Round ((HeadCrsRad * Radians))
12 090D       ELSE TrueHeading := TrueCourse - Round ((HeadCrsRad * Radians));
12 094D       END;
11 094D
11 094D     WRITE (Printer, TrueCourse:17, Magnetic (TrueCourse):8,
11 097A                    GroundSpeed:7, Distance:9, TrueHeading:10,
11 09A1                    Magnetic (TrueHeading):9, '  ');
11 09C7     HourMinute (Printer, Distance / GroundSpeed);
11 09EB     WRITELN (Printer);
11 09F6
11 09F6     TotalDist := TotalDist + Distance;
11 0A05     TotalTime := TotalTime + (Distance / GroundSpeed);
11 0A2D   END;
00 0A31   (**********************************************
00 0A31   *
00 0A31   *  Main Program Entry
00 0A31   *
00 0A31   **********************************************)
00 0A31
00 0A31   BEGIN
01 0A39     Setup;
01 0A40
01 0A40     WRITELN;
01 0A48     WRITE ('STARTING POINT: ');
01 0A69     READLN (ChkPntName);
01 0A7F     FirstTime := True;
01 0A85
01 0A85     REPEAT
01 0A85       Latitude := Coordinate ('LATITUDE');
01 0AAC       Longitude := Coordinate ('LONGITUDE');
01 0AD4
01 0AD4       IF FirstTime THEN FirstTime := False
01 0ADC                    ELSE ComputeLeg;
01 0AEB
01 0AEB       WRITE (Printer, ChkPntName,' ');
01 0B0D       HourMinute (Printer, Latitude);
01 0B22       WRITE (Printer, ', ');
01 0B36       HourMinute (Printer, Longitude);
01 0B4B       WRITELN (Printer);
01 0B54
01 0B54       LastLat := Latitude;
01 0B64       LastLong := Longitude;
01 0B74
01 0B74       WRITELN;
01 0B7C       WRITE ('CHECKPOINT: ');
01 0B99       READLN (ChkPntName);
01 0BAF     UNTIL ChkPntName = '';
01 0BBF
01 0BBF     FOR I := 1 TO 68 DO WRITE (Printer, '-');
01 0BF6     WRITELN (Printer);
01 0BFF
01 0BFF     WRITE (Printer, Round (TotalDist / TotalTime):32,
01 0C29                     TotalDist:9, ' ':21);
01 0C45     HourMinute (Printer, TotalTime);
01 0C5A     WRITELN (Printer);
01 0C63
01 0C63     WRITELN (Printer, 'True Airspeed: ', AirSpeed);
01 0C91     WRITELN (Printer, 'Wind Speed:    ', WindSpeed);
01 0CBF     WRITELN (Printer, 'Wind Direction:', WindDirect);
01 0CED     WRITELN (Printer, 'Magnetic Var:  ', MagneticVar);
01 0D1B     WRITELN (Printer, ' ');
01 0D31     WRITE (Printer, 'Departure Time: ');
01 0D53     HourMinute (Printer, DepartTime);
01 0D68     WRITELN (Printer);
01 0D71     WRITE (Printer, 'Arrival Time:   ');
01 0D93     HourMinute (Printer, DepartTime + TotalTime);
01 0DB3     WRITELN (Printer);
01 0DBC
01 0DBC     WRITELN ('TOTAL DISTANCE: ', TotalDist:5);
01 0DEB     WRITE ('TOTAL TIME:     ');
01 0E0C     HourMinute (Output, TotalTime);
01 0E20   END.
```

```
                         Navigation Log

                 True    Mag    Ground                True      Mag
Checkpoint      Course  Course   Speed   Distance   Heading   Heading   Time
--------------------------------------------------------------------

FDK   39:25,   77:22
                 265     272      90        22        260       267     0:15
MRB   39:23,   77:51
                 285     292      93        58        279       286     0:37
GRV   39:38,   79:03
                 262     269      90        38        257       264     0:25
MGW   39:33,   79:52
                 280     287      92        46        274       281     0:30
75D   39:41,   80:51
--------------------------------------------------------------------
                                  92       164                          1:47
True Airspeed:     99
Wind Speed:        12
Wind Direction:   220
Magnetic Var:       7

Departure Time:   1:45
Arrival Time:     3:32
```

One-Liner Contest Winner . . .

You've heard of falling stars? Well, here's a one-liner with a falling CoCo. Just type and *RUN*. If the CoCo hangs up after loading, just type *RUN* again.

The listing:

```
1 CLS:POKE65495,0:PMODE4:DIMN(50
,20):DRAW"BM9,9G1L4H2U3E2R4F1BD6
BR5H1U2E1R2F1D2G1L2BR14BU1G1L4H2
U3E2R4F1BD6BR5H1U2E1R2F1D2G1L2":
GET(1,2)-(40,11),N,G:SCREEN1,0:P
CLS:A=110:FORB=1TO185:PUT(A,B)-(
A+39,B+11),N,PSET:NEXTB:PLAY"O1V
31L255T255ABGEV20AGEV10AFE"
```

Brian Patrick
Huntsville, AL

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book Of Adventure* and its companion *Rainbow Adventure Tape*.)

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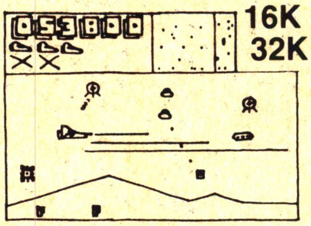

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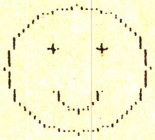

Level I - your child will work with colors, shapes, numbers, capital letters and small letters

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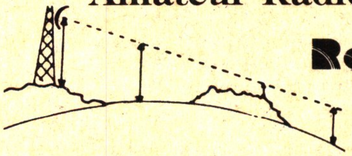

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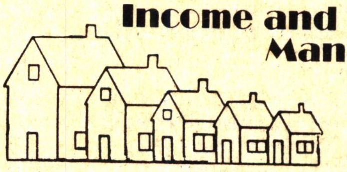

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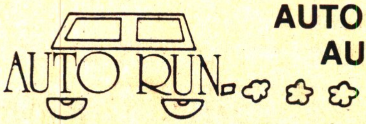

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Cartoon

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Old English-reverse	Cartoon-reverse	Gay Nineties-reverse
Old English-reverse/reduced	Cartoon-reverse/reduced	Gay Nineties-reverse/reduced

Old English Cartoon Gay Nineties

Tape 2

Broadway
Broadway

Broadway
Broadway-reduced
Broadway-reverse
Broadway-reverse/reduced

Tape 3

Business
Business

Business
Business-reduced
Business-reverse
Business-reverse/reduced

Old Style
Old Style

Old Style
Old Style-reduced
Old Style-reverse
Old Style-reverse/reduced

Antique
Antique

Antique
Antique-reduced
Antique-reverse
Antique-reverse/reduced

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KISSable OS-9

Transportation To Hacker Heaven — And Two Useful Routines

By Dale L. Puckett
Rainbow Contributing Editor

This column is going to be a short one. We had this project we needed to finish. THE RAINBOW wants to get it in your hands by Christmas. So, we hit it —12 to 15 hours a day for the past two weeks. I may never want to hear the name OS-9 again, but *The OS-9 Tour Guide* is in the capable hands of the editorial staff at THE RAINBOW.

It's A Book

Why did Peter Dibble and I want to write a book about OS-9? Why did THE RAINBOW want to publish one? The main reason — you need it.

Since its release on the Radio Shack Color Computer in October 1983, Microware's OS-9 Operating System has created a stir. Power-packed and efficient, OS-9 brought a UNIX-like environment to an inexpensive microcomputer for the first time.

Old-timers and hackers revelled in its power. Many beginners however, found it intolerable.

After answering hundreds of questions in this column, we discovered a pattern. People with no computer training or experience were rushing to their local Radio Shack and buying OS-9. Then, they rushed home, proudly inserted their new operating system and went to work.

With little fanfare and without too much difficulty, these converts learned to build files and list them to their CoCo's screen. Some even learned how to climb around on OS-9's directory tree. But eventually the honeymoon ended and a lot of new OS-9 users discovered that they didn't have the slightest idea about what to do with their new operating system.

Experienced users who had learned how to program using the Color Computer's MicroSoft BASIC, knew what they wanted to do. But OS-9 proved an alien environment to many. They found themselves lost in a reference manual that gave experienced mainframe programmers everything they needed, but left beginners wondering where to start.

In our new book, Peter and I have tried to lay down a foundation that will let you build a staple of OS-9 programming skills with ease. We've divided *The OS-9 Tour Guide* into six parts.

Part One presents an overview of OS-9. It gives you "The Big Picture." We encourage you to leave your computer off when you read it.

In Part Two we encourage you to turn your computer on, use our examples and experiment. You'll get your "Hands On" OS-9.

Part Three takes you on a seven-chapter tour of the complete OS-9 Utility Command Set. Each chapter introduces you to a number of commands that perform logically related functions.

In Part Four we introduce you to the major programming languages that run on OS-9 computers. You'll also learn a little about assembly language programming and OS-9 "toolkits." We have listed the assembly language code for several filters. Additional filters are written in C. Nearly two dozen BASIC09 listings introduce you to that state of the art language.

Part Five will move you "Toward the End of The Rainbow." Here you'll look inside OS-9 and explore the inner workings of Microware's operating system. You'll be in hacker heaven.

Finally, in Part Six, we'll show you the "Pot of Gold" that lies at the end of The Rainbow. You'll find several major listings including a hard disk driver, several ACIA drivers, etc. The additional sample modules are a bonus.

(Dale L. Puckett is a free-lance writer and programmer who has worked with the Motorola family of microprocessors since 1976. He just completed his first book, The Official BASIC09 Tour Guide, *this summer. It has been published by Microware and made its debut at the Chicago* RAINBOWfest. *He is the author of* DynaSpell, Readtest, Esther *and* Help, *which are available from Frank Hogg Laboratories. He serves on the Info World Software Review Board and is a Chief Warrant Officer in the U.S. Coast Guard.)*

Microware's Third Annual OS-9 Users Seminar

Microware's OS-9 Users Seminar is just like a fine wine. It gets better with age. This year was the third for the seminar and a success on all counts. As Bob Sorenson, a Microware programmer, remarked when he opened his tutorial about making new boot files, this seminar proves that people other than the programmers at Microware use OS-9.

RAINBOW publisher Lonnie Falk and I enjoyed the special two-hour Color Computer OS-9 session presented by Microware President Ken Kaplan.

"I guess I should start by saying that memory and disk space are a little tight on the Color Computer," Kaplan said. "No one at Tandy realized that BASIC09 wouldn't fit on the system disk."

After that tongue-in-cheek start, Kaplan proceeded to hand out good advice to Color Computer owners. He started with *Binex* and *Exbin* and compiled a list of programs you could safely remove from the backup of your Radio Shack OS-9 system disk that you use daily. *The OS-9 Tour Guide* has a complete chapter on this subject.

Then, he attacked the memory problem and named a few modules that could be removed from a beginners OS9Boot file. "Get rid of RS-232, PRINTER, /T1, /D2 and /D3, etc." he said.

In shotgun fashion, Kaplan spit out round after round of tips. We'll highlight them here.

— To use a communications program with Color Computer OS-9 you really need the Radio Shack RS-232 cartridge.

— The new updated Version 1.1 of Color Computer OS-9 has an ACIA driver built in. It's named ACIAPAK. A new device descriptor, /T2, uses it.

— The new release also has the Boot file loaded in a logical manner. The file manager is followed by the device drivers that use it. They are followed by the device descriptor that uses them.

— The bit rate data for the PRINTER and RS232 modules has been fixed.

— Graphics functions can be executed by simply sending out the special ASCII graphics codes listed in the appendix of the OS-9 Commands manual.

— An unwanted screen pause can be a problem when you are using graphics and print carriage returns. You can get around the problem if you are using BASIC09 by using the PUT statement instead of the PRINT statement.

— Microware may do another release of the GFX graphics package — actually the drivers built into OS-9 — that will give you the *PAINT* and *DRAW* commands you are used to with Extended Color BASIC.

— The mouse on the Color Computer looks just like a joystick to the software. This means you can put it to work with OS-9's built-in joystick routines.

— You can't pause when using the PRINTER module. There's nowhere for the "go ahead character" to come from.

— It is very dangerous to change disks in the middle of a session, especially if you forget and leave files open for update or write.

— Microware's COBOL compiler actually works pretty well on the Color Computer. However, because the language uses forms, it needs an 80-column card or an external terminal.

— Color Computer users were the first people in the world to receive XMODE utility command.

"SysCall . . . *lets you program OS-9 system calls directly in your BASIC09 program."*

— Kaplan noted that it is really not too unreasonable to run with two users on the Color Computer. He discussed the confusion regarding Baud rates on the external terminal and noted that it really only works well at 300 Baud. The reason — the frequency of the real-time clock on the Color Computer. It's only 60 Hertz.

— Why does the system freeze every time you do any disk input or output? The Radio Shack disk controller cartridge has the interrupt line from the Disk Controller connected to the halt line on the 6809. When the controller is finished with a read or write, it "unhalts" the processor using the 6809's NMI line.

— Ken mentioned that a lot of you have had trouble getting OS9Boot files configured properly and noted that many people have problems with the Baud rates.

— "On a Level I system, you can set the Baud rate all you want — until you initialize the driver. Once you do this, you cannot change it again. It is locked into the tables," Kaplan said.

As the session pushed toward the two-hour mark, Kaplan got out his crystal ball and looked at the future. He started by telling how you will be able to get your update of OS-9.

Your local Radio Shack store will have a listing of everyone who bought Version 1.0. And if your name is on the list, they will order it for you. It will be shipped directly from Fort Worth. Oh! If you didn't fill out your registration card, your name won't be on the list. Kaplan expects the cost of the update to be approximately $15.

What else is coming to Color Computer OS-9? Radio Shack is stocking OS-9 at ALL stores. This new policy started in September. Kaplan said that Version 2.1 of Microware's PASCAL compiler should be out in a month or so. And, DynaCalc just went into production.

Also on the software front, Radio Shack's TSEDIT — a screen editor with a high resolution screen and horizontal scrolling built in — has been ported to OS-9. It should be nearing the production stage.

Two Useful Routines

We're printing two useful routines this month. *SysCall* is an assembly language subroutine designed to work with BASIC09. It lets you program OS-9 system calls directly in your BASIC09 program. One of the handiest tools you'll ever find, it was written by Robert Doggett at Microware.

Also, we are presenting three BASIC09 procedures that show you how to create and use pipes. The procedure "POpen" creates a pipe by DUPEing one of the standard paths and using it as the path for the pipe that will go to or from the FORKed pipeline process. It uses *SysCall.*

The procedure "OutPipe" calls POpen to create a pipe to a spooler. The pipe lets the output of OutPipe be read and printed by the spooler. If you do not have a spooler program, you can open a path to any other program by changing the parameters in the *RUN* statement.

The procedure "InPipe" calls POpen to create a pipe from the OS-9 MDIR utility command to itself. InPipe can then read the standard output path from MDIR and display its output.

(continued on Page 284)

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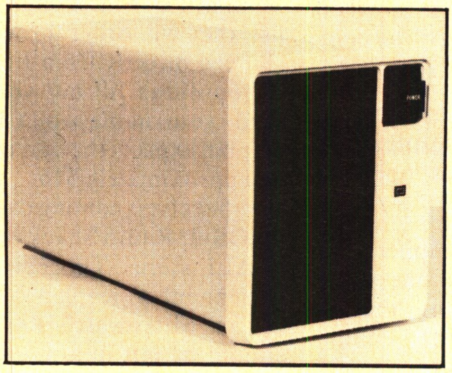

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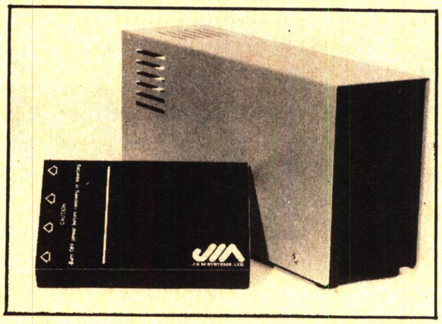

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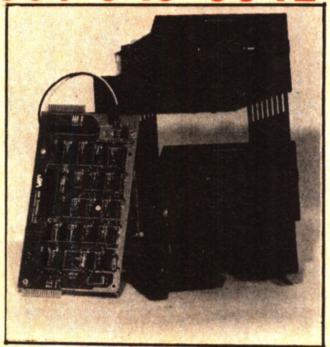

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THE PROCEDURE SYSCALL

```
Microware OS-9 Assembler 2.1   09/05/84 22:32:33                     Page 001
 - OS-9 System Symbol Definitions

00001         **********************************
00002         *  SYSCALL - a powerful subroutine for use with Basic09
00003         *  A special thanks to Robert Doggett for writing this routine.
00004
00005         * Basic09 calling sequence:
00006         * TYPE Registers=CC,A,B,DP:BYTE; X,Y,U:INTEGER
00007         * DIM regs:Registers
00008         * RUN SysCall(code,registers)
00009
00010         * SysCal will allow you to execute ANY OS-9 System call from
00011         * your Basic09 programs.  BE WARNED!!! SysCall can be VERY
00012         * dangerous, since it permits you to do things you may not want
00013         * done during program execution (like format disks, write
00014         * thousands of bytes all at once, and so on).  However, it can
00015         * also be very useful, IF you know what you are doing.
00016
00017         * NOTE:  This version of SysCall will cause a Basic09 runtime
00018         * error to occur if your system call returns an error.  This can
00019         * be easily overcome, as noted below.  If you do this, you
00020         * must check "regs.CC" to see if a system error has occurred.
00021
00022         * Here is an example of one possible use you may have for SysCall
00023
00024         * PROCEDURE filesize
00025         *  TYPE Registers=CC,A,B,DP:BYTE; X,Y,U:INTEGER
00026         *  DIM regs:Registers
00027         *  DIM path,callcode:BYTE \(* or INTEGER *)
00028         *  OPEN #path,"test":READ
00029         *  regs.A:=path
00030         *  regs.B:=2 \(* I$GetStt code *)
00031         *  RUN SysCall(callcode,regs)
00032         *  CLOSE #path
00033         *  PRINT USING "'filesize = $',2(h4)",regs.X; regs.U
00034
00035                             USE   /d0/defs/os9defs
00421                             opt   1
00422
00423
00424   0021           TYPE     set   SBRTN+OBJCT
00425   0081           REVS     set   REENT+1
00426   0000 87CD005E           mod   SyCalEnd,SyCalNam,TYPE,REVS,SyCalEnt,0
00427   000D 53797343  SyCalNam fcs   "SysCall"
00428   0014 02                 fcb   2           edition number
00429
00430   0038           E$Param  equ   56          Basic09's "Parameter Error" co
00431   103F           M.089    equ   $103F       OS-9 system call machine code
00432   0039           M.RTS    equ   $39         rts machine code
00433
00434 D 0000                    org   0           stacked variables:
00435 D 0000           Return   rmb   2           return addr
00436 D 0002           PCount   rmb   2           number of params passed
00437 D 0004           Function rmb   4           OS-9 function code
00438 D 0008           Regs     rmb   4           register image
00439
00440   0015 EC62      SyCalEnt ldd   PCount,S    Get parameter count
00441   0017 10830002           cmpd  #2          exactly two parameters?
00442   001B 263A               bne   ParamErr    abort if not
00443   001D EC6A               ldd   Regs+2,S    check size of register image
00444   001F 1083000A           cmpd  #10         exactly ten bytes?
00445   0023 2632               bne   ParamErr    abort if not


Microware OS-9 Assembler 2.1   09/05/84 22:32:50                     Page 002
 - Error Code Definitions

00446   0025 ECF804             ldd   [Function,S] get OS-9 function code
00447   0028 AE66               ldx   Function+2,S get size of function param
00448   002A 301F               leax  -1,X        INTEGER?
00449   002C 2629               bne   ParamErr    abort if not
00450   002E 1F98               tfr   B,A
00451
00452       * Now you build your OS9 call and return from subroutine on
00453       * stack (A)=OS9 function call
00454
00455   0030 C639      SysCall  ldb   #M.RTS      get "rts" machine code
00456   0032 3406               pshs  D
00457   0034 CC103F             ldd   #M.OS9      get OS-9 call machine code
00458   0037 3406               pshs  D
00459   0039 EE6C               ldu   Regs+4,S    get register image ptr
00460   003B EC41               ldd   R$D,U       initialize regs for system cal
00461   003D AE44               ldx   R$X,U
00462   003F 10AE46             ldy   R$Y,U
00463   0042 EE48               ldu   R$U,U
00464   0044 ADE4               jsr   0,S         execute system cal
00465   0046 3441               pshs  CC,U        save CC,U
00466   0048 EE6F               ldu   Regs+7,S
00467   004A 3348               leau  R$U,U
00468   004C 363E               pshu  A,B,DP,X,Y return updated regs to caller
00469   004E 3512               puls  A,X         get CC,U
00470   0050 A7C2               sta   ,-U
00471   0052 AF48               stx   R$U,U
00472   0054 3264               leas  4,S         discard OS-9 call subroutine
00473
00474       * If you want to eliminate the possibility of a runtime error
00475       * remove the comment designator (*) from the next line.
00476
00477       * clrb
00478   0056 39                 rts
00479   0057 53        ParamErr comb               return carry set
00480   0058 C638               ldb   #E$Param    Parameter Error
00481   005A 39                 rts
00482
00483   005B 8931F4             emod
00484   005E           SyCalEnd equ   *

00000 error(s)
00000 warning(s)
$005E 00094 program bytes generated
$00E5 00229 data bytes allocated
$1006 04102 bytes used for symbols
```

THE BASIC09 PIPE PROCEDURES

```
PROCEDURE OutPipe
 0000
 0001      (* Demonstration of how you can create an output pipe
 0036
 0037      DIM Pipe:BYTE
 003E
 003F      RUN POpen(Pipe,0,"spl","-jn=Pipe.Test")
 0062      FOR X=1 TO 10
 0074        PRINT #Pipe,"This is test line #"; X
 0094      NEXT X
 009F      CLOSE #Pipe
 00A5
 00A6
PROCEDURE InPipe
 0000
 0001      (* Demonstration of how you can create an input pipe
 0035
 0036      DIM Pipe:BYTE
 003D      DIM Line:STRING[80]
 0049
 004A      RUN POpen(Pipe,1,"mdir","e")
 0062      ON ERROR GOTO 99
 0068      PRINT " ---executable modules in memory---"
 008F      LOOP
 0091        READ #Pipe,Line
 009B        IF MID$(Line,20,2)="11" THEN
 00AE          PRINT MID$(Line,37,32), \ ENDIF
 00BB      ENDLOOP
 00BF 99   CLOSE #Pipe
 00C8      PRINT
 00CA
 00CB
PROCEDURE POpen
 0000
 0001      (* This is how you can create a pipe to or from a specific program.
 0044      (* NOTE: This procedure assumes that you have paths 0, 1 and 2 open.
 0088      (* A special thank you to Robert Doggett for writing this program.
 00CA
 00CB      PARAM Pipe:BYTE \(* returns pipe path number
 00ED      PARAM StdPath:INTEGER \(* path #0, 1 or 2 to become pipe
 0115      PARAM Module,Params:STRING[80]
 0125
 0126      TYPE Registers=CC,A,B,DP:BYTE; X,Y,U:INTEGER
 014B
```

```
0014C      DIM Regs:Registers
0155       DIM Program,Parameter:STRING[80]
0165       DIM SavePath,SysDup,SysFork:BYTE
0174
0175       SysFork=$03 \(* OS-9 F$SysFork system cal
0199       SysDup=$82 \(* OS-9 I$SysDup system cal
01BC
01BD       CREATE #Pipe,"/pipe":UPDATE
01CD       Regs.A=StdPath
01D9       RUN SysCall(SysDup,Regs) \(* save std path
01F8       SavePath=Regs.A
0203       CLOSE #StdPath
0209       Regs.A=Pipe
0215       RUN SysCall(SysDup,Regs) \(* make std path the pipe
023D       Program=Module+CHR$($0D)
024A       Parameter=Params+CHR$($0D)
0257       Regs.A=0
0262       Regs.B=0
026D       Regs.X=ADDR(Program)
027B       Regs.Y=LEN(Parameter)
0288       Regs.U=ADDR(Parameter)
0296       RUN SysCall(SysFork,Regs) \(* fork pipeline process
02BD       CLOSE #StdPath
02C3       Regs.A=SavePath
02CF       RUN SysCall(SysDup,Regs) \(* restore std path
02F1       CLOSE #SavePath
```

User Group News

The OS-9 Users Group now has a Color Computer Club Coordinator. He is James Jones, 413 West Eufaula, Norman, OK 73069, a member of this SIG.

James will be working closely with the membership committee and hopes to furnish all Color Computer Clubs with a list of OS-9 Users Group members in each club soon. After this initial contact, he'll be encouraging them to form local OS-9 groups within their clubs. He will be working on the logistics of getting these new members active in the National Group, getting software exchange disks to the clubs, etc. If you would like to help, or if your club is interested, feel free to contact James directly.

Bill Turner, 3316 San Luis St., Tampa, FL 33629 has promised to serve as Information Coordinator for the OS-9 Users Group. Ray Patterson, Mountain View, Ariz., and Hal Brown, Huber Heights, Ohio, have volunteered to serve as members of this committee.

The group will gather a comprehensive list of citations of articles about the OS-9 operating system. This list will be published in MOTD, on the CompuServe OS-9 SIG and in other publications. This will be a real asset for people studying OS-9 techniques.

At the OS-9 Users Group meeting in Des Moines, we formed a resolution committee to deal with any present problems and future wishes regarding OS-9. We hope that the committee will serve both our members and the vendors of OS-9 software by cutting down the number of people hassling the vendors. Bill Turner, 3316 San Luis St., Tampa, FL 33629 is Chairman of the Committee. Members include Alan Clute of Sunnyvale, Calif.; Rick BeckenHauer of Norman, Okla.; Steve Blasingame and James Jones, Oklahoma City, Okla.; Philip Lucido, Sharpsville, Penn.; Dave Kaleita of Troy, Mich. and Bill Bolling of St. Louis, Mo.

On Helping Each Other

When you're getting together for your next Color Computer Club meeting, give some thought to a guest speaker. The speaker doesn't have to be someone who knows everything — just someone who knows about a specific field.

I spoke at the Northern Virginia Color Computer Club (NVCCC) September 1, and really enjoyed the chance to sit in. You too could be a guest speaker. For example, one NVCCC member recently gave a talk on disk drives and disk controllers. The guy didn't know everything there was to know, but he certainly gave out more information than a lot of members had available to them.

That's it for November. Enjoy *SysCall* and the BASIC09 pipe routines. Join us in December when we'll try to get this column back on track with several filter listings written in both assembly language and C. Happy Thanksgiving!

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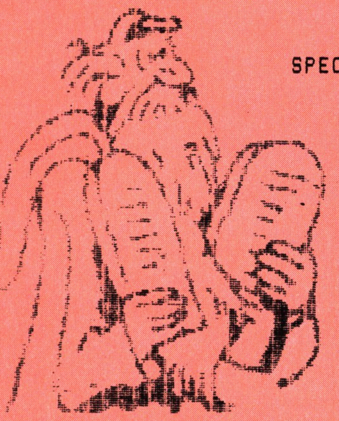

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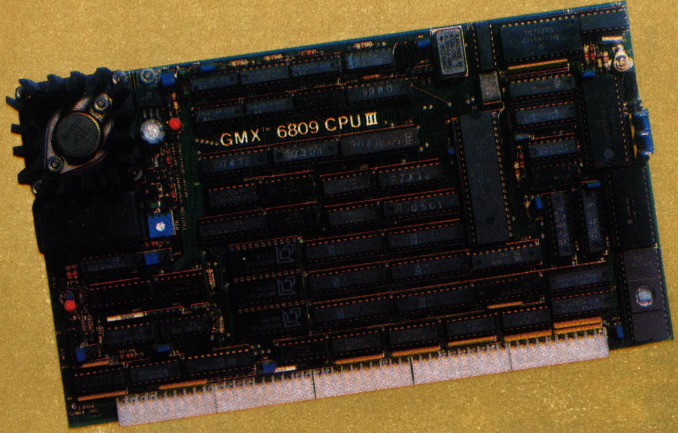

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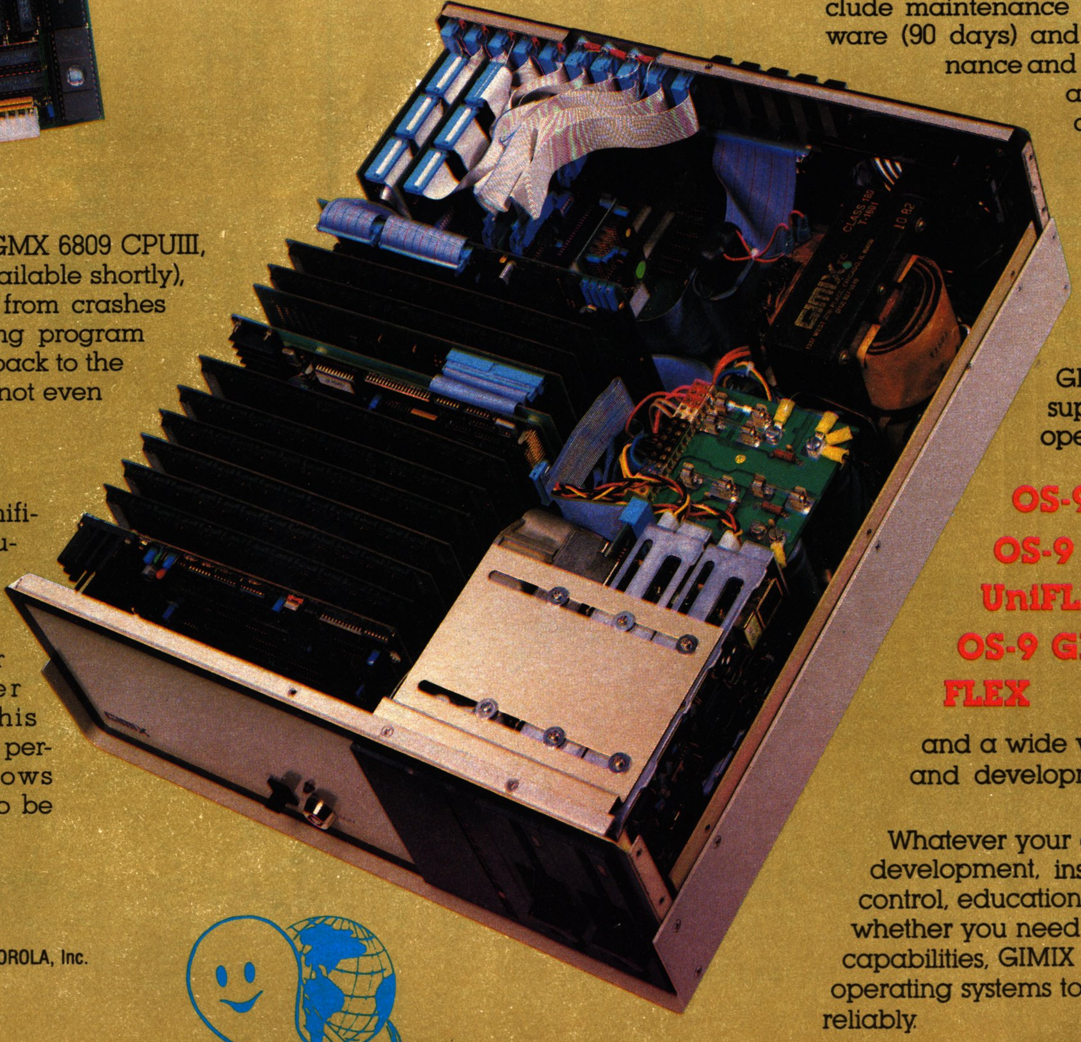

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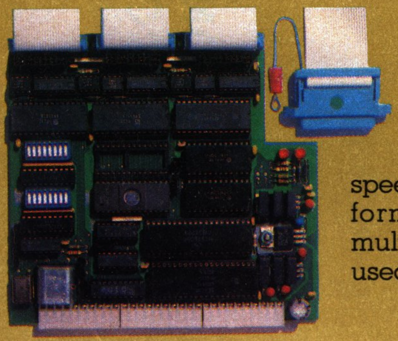

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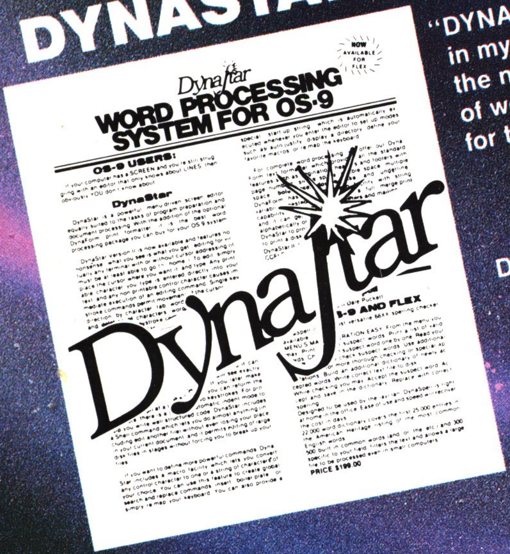

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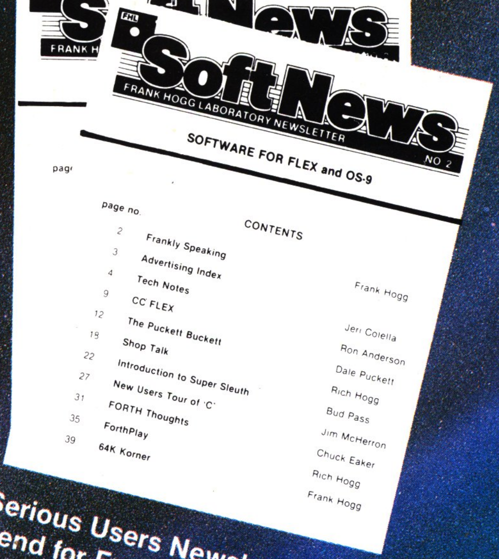

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